

2022-1765

**United States Court of Appeals
for the Federal Circuit**

VOLVO PENTA OF THE AMERICAS, LLC,

Appellant,

— v. —

BRUNSWICK CORPORATION,

Appellee.

*On Appeal from the United States Patent and Trademark Office,
Patent Trial and Appeal Board in No. IPR2020-01512*

NON-CONFIDENTIAL BRIEF FOR APPELLANT

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U.S. Patent No. 9,630,692 (Claim 1)

1. A steerable tractor-type drive for a boat, comprising:
a drive support mountable to a stern of the boat;
a drive housing pivotally attached to the support about a steering axis, the drive housing having a vertical drive shaft connected to drive a propeller shaft, the propeller shaft extending from a forward end of the drive housing;
at least one pulling propeller mounted to the propeller shaft,
wherein the steering axis is offset forward of the vertical drive shaft.

Appx0377, 5:48-58.

FORM 9. Certificate of Interest

Form 9 (p. 1)
July 2020

**UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

CERTIFICATE OF INTEREST

Case Number 2022-1765

Short Case Caption Volvo Penta of the Americas, LLC v. Brunswick Corporation

Filing Party/Entity Volvo Penta of the Americas, LLC

Instructions: Complete each section of the form. In answering items 2 and 3, be specific as to which represented entities the answers apply; lack of specificity may result in non-compliance. **Please enter only one item per box; attach additional pages as needed and check the relevant box.** Counsel must immediately file an amended Certificate of Interest if information changes. Fed. Cir. R. 47.4(b).

I certify the following information and any attached sheets are accurate and complete to the best of my knowledge.

Date: 09/21/2022

Signature: /s/ John C. Alemanni

Name: John C. Alemanni

FORM 9. Certificate of Interest

Form 9 (p. 2)
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1. Represented Entities. Fed. Cir. R. 47.4(a)(1).	2. Real Party in Interest. Fed. Cir. R. 47.4(a)(2).	3. Parent Corporations and Stockholders. Fed. Cir. R. 47.4(a)(3).
Provide the full names of all entities represented by undersigned counsel in this case.	Provide the full names of all real parties in interest for the entities. Do not list the real parties if they are the same as the entities. <input checked="checked" type="checkbox"/> None/Not Applicable	Provide the full names of all parent corporations for the entities and all publicly held companies that own 10% or more stock in the entities. <input type="checkbox"/> None/Not Applicable
Volvo Penta of the Americas, LLC		Mack Trucks, Inc., VNA Holding Inc., & AB Volvo

☐ Additional pages attached

FORM 9. Certificate of Interest

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July 2020

4. Legal Representatives. List all law firms, partners, and associates that (a) appeared for the entities in the originating court or agency or (b) are expected to appear in this court for the entities. Do not include those who have already entered an appearance in this court. Fed. Cir. R. 47.4(a)(4).

☒ None/Not Applicable ☐ Additional pages attached

5. Related Cases. Provide the case titles and numbers of any case known to be pending in this court or any other court or agency that will directly affect or be directly affected by this court's decision in the pending appeal. Do not include the originating case number(s) for this case. Fed. Cir. R. 47.4(a)(5). See also Fed. Cir. R. 47.5(b).

☐ None/Not Applicable ☐ Additional pages attached

Volvo Penta of the Americas, LLC v. Brunswick Corporation, C.A. No. 1:20-cv-01678 (DDE)		

6. Organizational Victims and Bankruptcy Cases. Provide any information required under Fed. R. App. P. 26.1(b) (organizational victims in criminal cases) and 26.1(c) (bankruptcy case debtors and trustees). Fed. Cir. R. 47.4(a)(6).

☒ None/Not Applicable ☐ Additional pages attached

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STATEMENT REGARDING CONFIDENTIAL MATERIAL OMITTED

Pursuant to Federal Circuit Rule 30(h)(1)(A), portions of pages 7, 8, 24, 45, and 46 have been omitted from the non-confidential version of the present Opening Brief, pursuant to the Modified Protective Order entered by the Board and the Board's orders on the parties' motions to seal confidential material. Appx5559-5569; Appx5585; Appx5638-5644; Appx5645-5651; Appx5652-5658; Appx5659-5671. Appellee Brunswick Corporation has represented that the omitted materials contain its confidential business information. The material omitted on page 7 includes a portion of Appellee's Brunswick Corporation's internal market assessment. The material omitted on page 8 includes a portion of Appellee Brunswick Corporation's internal market assessment and characterizes an aspect of Appellee Brunswick Corporation's approach to product development. The material omitted on pages 24 and 45 characterizes an aspect of Appellee Brunswick Corporation's approach to product development. The material omitted on page 46 includes a portion of Appellee Brunswick Corporation's internal market assessment.

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STATEMENT OF RELATED CASES

This is an appeal from the final written decision of the Patent Trial and Appeal Board (the “Board”) in No. IPR2020-01512.

A district court litigation involving the disputed patent and the parties is pending and currently stayed. *Volvo Penta of the Americas, LLC v. Brunswick Corporation*, No. 1:20-cv-01678-GBW (D. Del. filed Dec. 10, 2020).

No appeal from the same proceeding before the Board was previously before this or any other appellate court.

STATEMENT OF JURISDICTION

This appeal arises from a final written decision in an *inter partes* review proceeding filed by Brunswick Corporation (“Brunswick”) pursuant to 35 U.S.C. §§ 311 *et seq.* Appellant Volvo Penta of the Americas, LLC (“Volvo Penta”) timely filed its notice of appeal on May 4, 2022. Appx5628-5631. The Court has jurisdiction under 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. §§ 141(c), 319.

STATEMENT OF THE ISSUES

1. Whether the Board erred in ignoring or discounting abundant evidence of non-obviousness when it found the claims of the ’692 Patent were obvious.
2. Whether the Board erred in ignoring or discounting Volvo Penta’s evidence of secondary considerations of non-obviousness.
3. Whether the Board erred in failing to conduct a reasoned analysis of Volvo Penta’s secondary considerations of non-obviousness collectively with Brunswick’s alleged evidence of obviousness.
4. Whether the Board erred in finding that Volvo Penta’s evidence of secondary considerations of non-obviousness failed to exhibit a sufficient nexus to the claims of the ’692 Patent.

STATEMENT OF THE CASE

A. The Parties and the Market

Volvo Penta and Brunswick are direct competitors in various segments of the boating industry, and particularly with respect to marine drives. Appx3701, ¶ 4. Volvo Penta has a long history as an innovator in marine drive technology and is a world-leading supplier of marine power solutions for consumer and industrial applications. *See, e.g.*, Appx4494-4495. In fact, the patent for the first successful stern drive system was filed by James R. Wynne in 1958 and assigned to Volvo Penta. Appx0654. Brunswick has often followed Volvo Penta's innovations when designing Brunswick's competing products. Appx4881-4882. The same is true in this case. Appx4985.

Volvo Penta's patent, U.S. Patent No. 9,630,692 (the "'692 Patent"), is directed to a tractor-type stern drive, meaning its propellers face forward under the boat and pull rather than push the boat through the water. Appx0375, 1:6-9, 3:17-21.

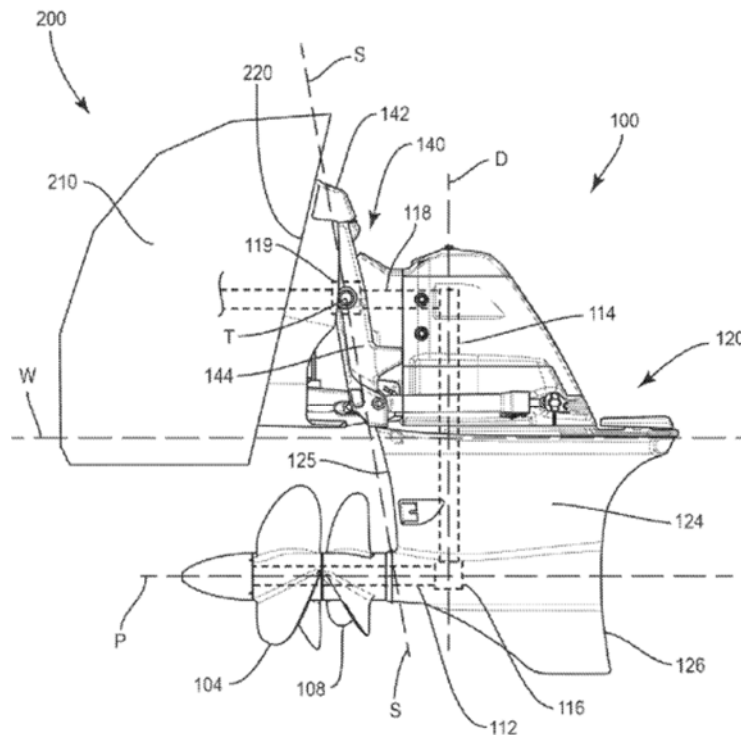


FIG. 3

Appx0373.

Among other advantages, the innovative design improves steering by reducing net torque about the steering axis while positioning the propellers forward of a drive housing to provide additional distance between the propellers and a swimmer or wake surfer; allows greater versatility related to trim angles which helps increase the performance of the boat, by, for example, allowing it to create a larger wake; and provides an exhaust pathway that is fully underwater as opposed to through the transom as with an inboard drive or the ventilation plate as with a rear-facing stern drive. Appx0370, Abstract; Appx0376, 3:10-27, 4:34-45; Appx4492, ¶ 7.

In recent decades, wake surfing, which entails a rider on a surf board very close to the rear of a boat, has dramatically increased in popularity. Appx4522. Because of their proximity to the rear of the boat, wake surfers have traditionally favored inboard drives primarily because in such boats, the propeller is positioned below the boat rather than behind the boat as with conventional stern drives. Appx4522. In the U.S., the wake surfing market had been dominated by expensive inboard boats. Appx1734. But Volvo Penta was able to enter the wake surfing market with an innovative product that would appeal to a broader range of customers. *Id.*; Appx3703; Appx3705; Appx3707-3708; Appx4713. Volvo Penta's solution was a new type of marine drive, specifically a stern drive with a forward-facing propeller tucked under the boat and with a steering axis positioned in front of the center of pressure. Appx4492, ¶ 7.

In 2014, Volvo Penta filed a patent application to protect its innovative forward-facing stern drive. Appx0370. Then in 2015, Volvo Penta launched its commercial embodiment, the Forward Drive, depicted below. Appx4040-4041, ¶ 51.



Appx4490-4491, ¶ 3.

The introduction of the Volvo Penta Forward Drive at the 2015 Miami International Boat Show was overwhelmingly successful as demonstrated by the effusive praise for the Forward Drive throughout the industry. *See, e.g.*, Appx4492, ¶ 6; Appx3703; Appx3705; Appx3707-3708; Appx3710; Appx3712-3713; Appx3715-3716; Appx3718; Appx3720; Appx3724-3725; Appx4496; Appx4499; Appx4501; Appx4502; Appx4504-4505; Appx4513; Appx4516; Appx4518. For example, the National Marine Manufacturers Association bestowed its Innovation Award for Alternate Drive Technology on the Forward Drive at the show. Appx4492, ¶ 6 (citing Appx4494, Appx4496); Appx3703; Appx3707-3708).

Boating World Magazine referred to the Forward Drive as “a game-changing propulsion system” Appx3712. The praise and accolades did not stop there:

- “This new-stern drive, which won the 2015 Innovation award from the National Marine Manufacturers Association, is revolutionary.” (Appx3707);
- “There were several game-changers in propulsion, and none made a bigger splash than Volvo Penta’s Forward Drive sterndrive system that has forward-facing propellers.” (Appx3710);
- “Radical: Volvo Penta’s Forward Drive Does a 180” (Appx3711);
- “. . . the real revolution starts in 2015 with Volvo Penta’s Forward Drive” (Appx3712);
- “a ‘transformative’ Volvo sterndrive” (Appx3715);
- “In a market dominated by aft-facing sterndrives, that’s pretty revolutionary . . .” (Appx3718);
- “. . . the futuristic Volvo Penta Forward Drive system” (Appx3720); and
- “. . . the first-of-its-kind propulsion system Volvo developed that’s likely to become a must-have for every tow-sports enthusiast” (Appx3720).

Volvo Penta’s “game-changing,” “revolutionary,” “transformative,” “first-of its-kind” stern drive provided a more versatile alternative for water-sports enthusiasts. The advantages of the Forward Drive, for example, include the forward facing propellers, which provide additional distance between the propellers and the

wake surfer, the ability to trim the drive, which helps increase the performance of the boat, by, for example, allowing it to create a larger wake, and having the steering axis offset forward of the drive shaft to help minimize steering torque about the steering axis. Appx4492, ¶ 7. The Forward Drive allowed stern drive boats to compete in the wake surf market, which has been experiencing market assessment [REDACTED]. See Appx4492, ¶ 7; Appx4522-4523. And the expansion and growth of the wake surf market enabled by Volvo Penta's innovation continues: even pontoon boats using Volvo Penta's innovative drive are now being used for wake surfing. Appx4492, ¶ 7 (citing Appx4741; Appx4742-4743).

Since the Forward Drive's commercial launch and prior to Brunswick's copycat product, Volvo Penta had been the exclusive provider of a stern drive embodying the claims of the '692 Patent. Appx4493, ¶ 9. Volvo Penta's sales of the Forward Drive product significantly increased since the launch of the Forward Drive. Appx4493; *see also* Appx4522. More and more boat builders are offering the Volvo Penta Forward Drive as original equipment, including boats specifically designed to incorporate the Forward Drive. Appx4493, ¶ 8; Appx4522. By 2019, more than 50 boat models were available that featured the Volvo Penta Forward Drive. Appx4522. And it is the innovative features embodied in the Forward Drive that have led to this success.

Brunswick's own documents show the reality of the market landscape and Volvo Penta's resulting success from its revolutionary Forward Drive. *See, e.g.*, Appx4543. For example, Brunswick was even feeling pressure from its own customers in this market. *See id.*

Brunswick recognized the many advantages provided by the Forward Drive, including, for example, versatility otherwise absent in conventional stern drives. Appx4522; Appx4543. However, despite widespread industry praise, Brunswick waited on the sidelines for years while Volvo Penta demonstrated the success of its patented design in the previously-unavailable wake surf market, unwilling to develop and launch its own competing product until Volvo Penta had successfully demonstrated that its innovative stern drive had the ability to successfully meet market demand.

Finally, after four years of witnessing the tremendous success and **market** **assessment** of Volvo Penta's Forward Drive (and years after the issuance of the '692 Patent), Brunswick decided to **activity** the Volvo Penta Forward Drive, and in August 2020 launched a stern drive with forward-facing propellers, the Bravo Four S, embodying claims of the '692 Patent. Appx4522; Appx4523 ("With the **market** **assessment** Volvo is seeing . . ."); Appx4543; Appx4086-4087, ¶¶ 119-120. The launch was on the very same day Brunswick filed its *inter partes* review ("IPR") Petition. Appx3726; Appx0123. The threat of the Forward Drive was so significant that doing

nothing would result in Brunswick losing market share. Appx4523. But in response, Brunswick improperly capitalized on Volvo Penta's revolutionary and game-changing design with Brunswick's copycat product. Appx4523.

The similarities of Brunswick's Bravo Four S and Volvo Penta's Forward Drive are impossible to ignore. A side-by-side comparison of the two drives is shown here:



Petitioner's Bravo Four S



Volvo Penta's Forward Drive

Appx4185-4199, ¶¶ 101-117. These similarities are not surprising as Brunswick used the Volvo Penta Forward Drive as a “benchmark” throughout the entire development of Bravo Four S. *See, e.g.*, Appx4814 (Section “Benchmarking”); Appx4776; Appx4783; Appx4630; Appx4547-4605.

Industry commentators could not help but immediately recognize these similarities. *See, e.g.*, Appx3748; Appx3758. Even Brunswick's marketing of its

copycat Bravo Four S mimics the industry praise accorded Volvo Penta's Forward Drive when it was launched five years ago. *Compare* Appx3705 (headline including "moves forward"), Appx3712 ("Forward Thinking"), Appx3718 (headline including "Drives Forward"), *and* Appx3741 ("Moving you Forward").

B. Volvo Penta's '692 Patent and Brunswick's IPR

Apparently aware that its copycat product, the Bravo Four S, infringes the claims of '692 Patent, Brunswick requested *inter partes* review of the '692 Patent on the very same day Brunswick commercially launched its Bravo Four S. Appx3726; Appx0123. In the IPR, Brunswick alleged four grounds of invalidity: (1) anticipation based on its own Kiekhaefer outboard motor patent, (2) obviousness in view of Kiekhaefer and Stechauner, (3) obviousness based on Brandt (a Volvo Penta stern drive patent issued in 1989) and Kiekhaefer, and (4) obviousness based on Brandt, Kiekhaefer, and Stechauner. Appx0392. The Board found that Kiekhaefer does not anticipate any claim of the '692 Patent, concluding that "the independent claims are limited to improvements involving stern drives, and do not encompass, for example, improvements involving outboard propulsion systems." Appx0025. The Board did however find that it would have been obvious to redesign the stern drive of Volvo Penta's Brandt reference in light of the outboard motor of Brunswick's Kiekhaefer reference to arrive at each of the claims of Volvo Penta's

'692 Patent. Appx0038-0064; Appx0088-0115. The only ground on appeal is the Board's finding of obviousness in view of Brandt and Kiekhaefer.¹

The two references on which the Board relied were owned by the parties: Brandt is a 30-year old U.S. patent describing Volvo Penta's innovative stern drive with rear-facing propellers, and Kiekhaefer is a 70-year old U.S. patent assigned to Brunswick that describes an outboard motor that could be configured to have either rear-facing or forward-facing propellers. Appx1645; Appx1641.

After reaching its conclusion on its obviousness determination, the Board then found evidence of each of the six secondary considerations of non-obviousness that Volvo Penta raised in response to the obviousness challenge. Appx1285-1309. The Board however found that Volvo Penta had not met its burden of establishing a sufficient nexus of that evidence to the claims of the '692 Patent. Appx1286-1293. The Board's nexus decision was based exclusively on a single statement in an issue of "Volvo Group magazine," that the Forward Drive "includes several patented features that make the drive stand out," and the fact that the issue of the magazine published prior to the issuance of the '692 Patent. Appx1286-1288. Notwithstanding

¹ The Board did not provide any findings regarding Ground 4, stating "we do not reach this asserted ground because we have already found these claims unpatentable under Brandt/Kiekhaefer." Appx0118 n.4.

the nexus question, and despite crediting evidence of each of Volvo Penta's six secondary considerations of non-obviousness, the Board in a single sentence found that Brunswick's obviousness case was "strong," and that the evidence of secondary considerations failed to outweigh it. Appx1309.

SUMMARY OF THE ARGUMENT

The Board's conclusion that the '692 Patent is obvious is rooted in impermissible hindsight. The Board found evidence of numerous secondary considerations of non-obviousness, including actual and exhaustive copying by Brunswick of Volvo Penta's patented product, significant commercial success, extensive industry praise, skepticism, long-felt but unsolved need, and a failure of others. But then, without any explanation whatsoever, the Board found that the claims of the '692 Patent are obvious. In just a single sentence, the Board concluded that, notwithstanding Volvo Penta's evidence of secondary considerations of non-obviousness, the evidence failed to prevail over Brunswick's purportedly "strong" evidence of obviousness. This Board's conclusion is legally erroneous and not supported by substantial evidence.

As this Court has often observed, inventions in the mechanical realm can seem simple once made public. Such seemingly simple innovations are most at risk of improper hindsight, using the invention as a roadmap to combine various elements from the prior art while ignoring objective evidence demonstrating the challenges

the inventors faced and the impact of their innovation. That is precisely what the Board has done in this case. The Board arrived at an obviousness conclusion and then selectively evaluated some of the evidence while ignoring other evidence and, in the end, never explaining how it arrived at its final conclusion. The Board's final written decision should be reversed, or at the very least, remanded to consider evidence it ignored and to explain its ultimate conclusion of obviousness.

The Board's determination that the claims of the '692 Patent were obvious over Brandt and Kiekhäfer is not supported by substantial evidence. This is due to numerous errors by the Board. *First*, in finding a motivation to combine, the Board primarily and improperly relied on the knowledge of a non-POSITA Volvo Penta employee regarding his personal knowledge as evidence of what a POSITA would have known at the time of invention. *Second*, the Board ignored that Brunswick, despite possessing its primary prior art reference for decades, *never* attempted the proposed modification itself. *Third*, the Board ignored that Brunswick's proposed modification would have entailed a nearly total and exceedingly complex redesign. *Fourth*, the Board ignored the complexity of shifting the vertical drive shaft of its primary reference in order to arrive at the claims of the '692 Patent. *Fifth*, the Board dismissed entirely the fact that during the proceeding, Brunswick itself attempted to make its proposed modification to a commercial embodiment of the stern drive described in the Brandt reference on which Brunswick relied and utterly failed to

create a functional drive operable for its intended purpose, namely propelling a boat in the water.

Additionally, the Board's evaluation of the immense body of evidence of secondary considerations of non-obviousness was legally erroneous. *First*, the Board failed to sufficiently explain how much weight it was assigning the evidence Volvo Penta proffered in support of each of six secondary considerations, assigning many of the factors, including *Brunswick's actual copying*, vaguely, only "some weight." *Second*, the Board failed to conduct a reasoned collective weighing of the evidence of secondary considerations, indicating only in a single sentence, and as an afterthought, that it failed to outweigh Brunswick's "strong" evidence of obviousness. *Third*, the Board failed to consider the evidence of secondary considerations as part of the totality of evidence, and instead improperly shifted the burden to Volvo Penta through the Board's two-step analysis.

The Board's determination that Volvo Penta had not established a nexus between the evidence of secondary considerations and the claims of the '692 Patent was unsupported by substantial evidence for two reasons. *First*, the Board improperly hinged its entire determination that Volvo Penta had not established the claims' coextensiveness on a single, marketing-oriented statement, made before issuance of the '692 Patent, touting Volvo Penta's drive as having "several patented features," while ignoring evidence to the contrary. *Second*, the Board ignored

compelling evidence that the evidence of secondary considerations, including *Brunswick's actual copying of each of the claimed features of the '692 Patent*, were not the direct result of unique characteristics of the claimed invention.

The Board erred in finding the claims of the '692 Patent invalid as obvious. The Board's hindsight-driven obviousness conclusion glosses over and ignores the inherent complexity that would be required to make the proposed combinations, including numerous modifications and technical obstacles; fails to identify sufficient teachings and motivation to combine the asserted references; and ignores and improperly discounts the overwhelming evidence of secondary considerations of non-obviousness. The Court should reverse the Board's obviousness determination, or at the very least remand so that the Board can consider all the evidence and provide a reasoned weighing of Volvo Penta's evidence concerning the secondary considerations of non-obviousness.

ARGUMENT

A. Standard of Review

The ultimate conclusion of obviousness is a legal determination based on underlying factual findings. *See Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1366 (Fed. Cir. 2016). The Board's obviousness determination is thus subject to *de novo* review and its factual findings are reviewed for substantial evidence. *Id.* In reviewing the Board's factual findings for substantial evidence, this

Court “asks ‘whether a reasonable fact finder could have arrived at the agency’s decision’ and requires examination of the ‘record as a whole, taking into account evidence that both justifies and detracts from an agency’s decision.’” *Id.* (quoting *In re Gartside*, 203 F.3d 1305, 1312 (Fed. Cir. 2000)).

B. The Board’s Determination That the Challenged Claims Were Obvious Over Brandt and Kiekhaefer Was Not Supported by Substantial Evidence and Failed to Consider the Totality of Evidence.

1. The Board’s Motivation to Combine Determination Relies on Significantly Flawed Evidence.

In order to find a motivation to combine, the Board relied on three pieces of evidence. The first two are interrelated and unconvincing—the prior art includes a statement that a forward-facing propeller on an outboard drive designed to be used on a racing boat is “more efficient and capable of higher speeds,” and Brunswick’s expert merely parrots this statement. Appx1408 (citing Appx1643, 1:11-13). The third piece of evidence on which the Board relies is irrelevant: a statement by Volvo Penta’s employee during the proceeding regarding his own knowledge, which the Board improperly relies on as demonstrating what a POSITA would have known at the time of invention. Appx0048 (citing Appx1813, 43:7-9).

a) The Board Improperly Relied On One Generic Statement from a Decades-Old Patent Describing a Different Type of Drive and a Different Application as its Purported Motivation to Combine the Prior Art

In its final written decision, the Board states, “the motivation stems from an *express statement* in the prior art, (i.e., Kiekhaefer) that changing to a forward-facing propeller arrangement is one way to provide a system that is ‘more efficient and capable of higher speeds.’” Appx0046 (quoting Appx1643, 1:10-13). This statement, which lacks context, is from a reference related to an outboard drive and fails to provide sufficient motivation why a POSITA would have modified Brandt, a stern drive.

The Board itself found that “the independent claims are limited to improvements involving stern drives, and do not encompass, for example, improvements involving outboard propulsion systems.” Appx0025. As the Board further stated “Kiekhaefer only discloses improvements involving outboard propulsion systems.” *Id.* Yet inexplicably, the Board relies on an improvement involving outboard propulsion systems, namely applying the reversible propellers of the Kiekhaefer outboard motor reference to the Brandt stern drive to reach its final obviousness determination. Both of these conclusions cannot be correct: that the claims do not encompass improvements involving outboard propulsion systems and yet it would be obvious to modify a stern drive using improvements to an outboard propulsion system.

Moreover, a desire for “increased speed” would not suggest a POSITA modify Brandt with the teachings of Kiekhaefer to arrive at the claimed forward-facing stern drive as maximum speed is neither the sole nor primary metric by which the performance of most recreational boats are judged. *Id.* And in the wake surfing market, the target market for Volvo Penta’s innovative drive, the boat travels at very low speeds: “only 10 to 12 mph.” Appx3712.

Moreover, Kiekhaefer describes that its desire for increased speed and efficiency is for a very specific application, a racing boat:

In high speed operation the turbulence of the water passing the gear case 11 into the propeller 22 adversely affects the propeller efficiency and speed of the boat. By disposing the propeller forwardly of gear case 11 greater efficiency and speed is obtained as would be desired where the motor is mounted on the racing boat 39 shown in Fig. 2.

Appx1644, 3:3-10. This important context was ignored by the Board. Appx0046. Further, there is no evidence that the primary reference, Brandt, is related to racing boats nor that a POSITA would have relied on a teaching directed toward improving speed and efficiency of a racing boat as motivation to modify the stern drive of Brandt. This evidence was ignored by the Board in its conclusion.

The lone statement in Kiekhaefer on which the Board relies provides insufficient support, absent hindsight, for the Board’s conclusion regarding

motivation to combine the stern drive of Brandt with the outboard motor of Kiekhaefer. The relied-upon statement amounts to no more than a generic motivation in marine drives of increasing speed and efficiency without consideration of the particular teachings and the state of the art and specific claims. Such generic motivation is insufficient to support an obviousness conclusion. This Court has held that a jury cannot reasonably find the motivation to support obviousness based solely on testimony that “is generic and bears no relation to any specific combination of prior art elements,” and that “fails to explain why a person of ordinary skill in the art would have combined elements from specific references in the way the claimed invention does.” *ActiveVideo Networks, Inc. v. Verizon Commc’ns, Inc.*, 694 F.3d 1312, 1328 (Fed. Cir. 2012) (affirming pre-verdict judgment as a matter of law); *see also Innogenetics, N.V. v. Abbott Lab’ys*, 512 F.3d 1363, 1373 (Fed. Cir. 2008) (The Court must distinguish between “knowledge of a problem and motivation to solve it” and the requisite “motivation to combine particular references to reach the particular claimed method.”); *Broadcom Corp. v. Emulex Corp.*, 732 F.3d 1325, 1334 (Fed. Cir. 2013) (“[A] finding of obviousness at the time of invention requires a ‘plausible rational[e] as to why the prior art references would have worked together.’” (quoting *Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1352 (Fed. Cir. 2010))).

b) Even Accepting the Board’s Motivation, the Board Ignored Evidence Including Brunswick’s Own Statements Demonstrating that a POSITA Would Turn to Alternative Solutions to Increase Speed and Efficiency

Even assuming that such a generic motivation to combine were sufficient, the Board improperly treated the solution to greater speed and efficiency as binary: either the propellers are rear-facing or forward-facing. The Board accepted Brunswick’s argument in its Petition that there were a finite number of solutions (here: a total of two) to “increase speed and efficiency” and in so doing improperly discounted evidence that the number of solutions were not so limited, and were not so simple. Appx0044. Volvo Penta presented evidence showing the multitude of complex solutions to address the generic “increase speed and efficiency” motivation—including Brunswick’s own statements. Appx0043; Appx0699-701; Appx4065, ¶ 92; Appx3728; Appx4385. While the Board noted Volvo Penta’s position (*see, e.g.*, Appx0043-0044), the Board does not address the evidence showing the complexities and multitude of solutions, and instead concludes that Kiekhäfer’s generic “*one way*” to increase speed and efficiency is a sufficient motivation to modify Brandt—despite evidence that shows a POSITA would not have been so motivated.

In so concluding, the Board also ignored evidence of all the variations and alternatives that Brunswick itself had applied to its own rear-facing drives to achieve speed and efficiency, never suggesting that a POSITA would reverse the propellers.

There is no evidence prior to witnessing Volvo Penta’s invention, that Brunswick ever considered a commercial embodiment with forward-facing propellers. In fact, Brunswick’s own website touts its efforts to increase performance, efficiency, and speed with rear-facing propellers to outperform forward-facing systems.

Superior Performance.

Over the years, pod drives have delivered impressive performance with both forward-facing and rear-facing propellers. Which type of propeller is more efficient?

Forward-facing propellers are exposed to undisturbed water, which can improve efficiency; however, these propellers increase form drag, created by friction from water flowing across the pod—so the faster the flow of water, the more drag occurs. Rear-facing propellers create less form drag. This tradeoff between propeller efficiency and increased form drag results in both types of propellers having nearly identical efficiency.

Our real gains in efficiency over traditional inboards result from a decrease in overall drag, the creation of horizontal thrust, and the use of counter-rotating propellers. Our results are impressive: 15% faster top speed, 15% faster cruise speed, and dramatic 30% improvement in fuel economy.

Appx3728. Brunswick, recognizing that pod drives could have forward-facing or rear-facing propellers, chose other solutions to achieve the “superior performance” and “real gains in efficiency” resulting in faster top speed, cruise speed, and fuel economy. *Id.*

Brunswick’s expert also identified other ways in which he personally improved the efficiency and speed of a drive. Mr. Schofield testified that he “personally addressed it by moving the propeller hubs near the surface and getting supercavitating propellers to get the gear case out of the water” and into clean water. Appx4385, 144:11-15. And there are numerous other changes that may increase speed and efficiency—changes that account for and address complexities in

propulsion systems. Appx4065-4066, ¶ 92. Kiekhaefer's teaching alone of identifying pulling-type propellers as more efficient and capable of higher speeds does not provide sufficient reasons for a POSITA to so modify Brandt, particularly in light of all the other evidence before the Board. *Id.* Thus, contrary to Brunswick's argument in its petition that there are a finite number of predictable solutions, the evidence—including Brunswick's own statements—shows there are numerous such solutions. The Board's refusal to consider the evidence demonstrating all of the various other ways to achieve greater speed and efficiency is error. Appx0044-0045. *See Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124 (Fed. Cir. 2000) (holding ultimate determination of obvious is "a legal conclusion based on the totality of the evidence.").

c) Brunswick's Expert Testimony Adds Nothing

The Board also relies on Brunswick's expert, Mr. Schofield, who merely parrots the lone statement in Kiekhaefer, again without context. Appx1408, ¶ 114. Schofield states "[s]pecifically, Kiekhaefer explains that pulling-type/tractor-type propellers are 'more efficient and capable of higher speeds,' [and] [a] PHOSITA who would have wanted to improve efficiency and increase the speed of Brandt's drive would have immediately considered modifying Brandt to use pulling-type/tractor-type propellers." Appx1408, ¶ 114 (quoting Appx1643, 1:11-13). Mr. Schofield merely repeating the statement in Kiekhaefer in relation to the Brandt

reference adds nothing. *See, e.g., ActiveVideo Networks*, 694 F.3d at 1327 (rejecting conclusory expert testimony concerning obviousness as “fraught with hindsight bias”). Mr. Schofield’s testimony is not substantial evidence, and the Board’s reliance on it was error. Appx0044-0045.

d) Testimony from Volvo Penta’s Non-POSITA Business Employee Regarding His Knowledge Cannot Support the Board’s Motivation to Combine

To fill this obvious gap, the Board improperly relies on Volvo Penta’s business employee Mr. Sweet and his testimony about what Volvo Penta learned during testing of another type of drive incorporating a forward-facing propeller. Appx0047; Appx0048. As the Board acknowledged, Mr. Sweet is not a POSITA. Appx0047-0048. In relation to the IPS pod drive (not the Forward Drive), Mr. Sweet testified, “we knew from the IPS product that we have, that we had brought to market in 2005, that putting the propellers on the front of the stern drive created quite a bit of efficiency. . . .” Appx1813, 43:3-9. The Board relied on this testimony to support its assertion that a POSITA would have understood that Kiekhaefer’s teachings apply to stern drives. Appx0047. Reliance on non-POSITA testimony is insufficient to establish the knowledge of a POSITA. *See Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 3 (1966) (stating that the obviousness inquiry is with respect to the knowledge of a person having ordinary skill in the art at the time of the invention).

Further, the Board cited no evidence that Mr. Sweet's knowledge about Volvo Penta's testing of its IPS drive was even publicly known, much less known by a POSITA. Thus, the Board's reliance on this evidence is error and renders its conclusions based on this evidence unsupported. Appx0046; Appx0048.

2. The Board Ignored That Brunswick, in Spite of Possessing the Primary Prior Art Reference for 70 Years, Never Itself Developed any Forward-Facing Drive Until Witnessing Volvo Penta's Invention.

Brunswick filed the application that issued as Kiekhaefer over 70 years ago, in 1949. Appx1643. There is no evidence in the record that in all the years since then Brunswick ever commercialized a forward-facing drive of any type. Appx4521-4522. Brandt issued 40 years later, in 1989. Appx1645. In all the years since Brandt issued, and despite actively competing with Volvo Penta in the stern-drive market, Brunswick still did not develop a forward-facing drive. *Id.* Instead, Brunswick waited until several years after Volvo Penta launched the commercial embodiment of the '692 Patent before deciding to **activity** that drive with its own Bravo Four S. Appx4522; Appx4523; Appx4543. Further, there is no evidence that Brunswick itself relied on its Kiekhaefer reference during development of its Bravo Four S, instead consistently relying on the Volvo Penta Forward Drive it purchased and disassembled. *See, e.g.,* Appx4184, ¶ 99; Appx4185-4186, ¶ 102. In such situations, “[t]he length of the intervening time between the publication dates of the prior art and the claimed invention can . . . qualify as an objective indicator of

nonobviousness.” *Leo Pharm. Prods., Ltd. v. Rea*, 726 F.3d 1346, 1359 (Fed. Cir. 2013); *see also Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957-58 (Fed. Cir. 1997) (“Indeed, the years of use of salty bait and of plastic lures, without combining their properties, weighs on the side of unobviousness of the combination.”).²

The Board summarily refused to consider this evidence on the basis that Volvo Penta purportedly “[did] not show that any ‘inability or unwillingness of competitors’ to develop alternative products ‘is rooted in the subject matter’ of the challenged claims . . . rather than *other* factors, such as, for example, lack of market demand.” Appx1308-1309 (citing *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir.

² The Board (at Appx0063) cited and relied upon a single sentence from a decision issued by this Court’s predecessor, *In re Wright*, 569 F.2d 1124, 1127 (CCPA 1977), that was in tension with this Court’s *Arkie Lures* decision holding that the “the years of use of [multiple prior art references], without combining their properties, weighs on the side of nonobviousness of the combination.” *Arkie Lures*, 119 F.3d at 957-58. But the Board offered no explanation as to how that CCPA case applies or why it preferred that case over this Court’s precedent issued 30 years later. The conclusory treatment with no explanation of the *Arkie Lures* case again demonstrates the Board’s preordained obviousness determination.

1995)). This is incorrect. Volvo Penta demonstrated that Brunswick delayed entering the wake surf market despite growing and significant market pressures to develop and release a forward-facing stern drive suitable for that market. Appx0876; Appx1734-1736; Appx4522. The Board ignoring this evidence only serves to highlight the Board's reliance on hindsight and is clear error.

3. The Board Also Ignored the Nearly Complete Redesign That Brunswick's Asserted Combination Would Require.

Volvo Penta presented compelling evidence, including from Brunswick's own expert, that dozens of highly complex modifications to the stern drive of Brandt would have been required in making its proposed combination with Kiekhaefer. Appx0689-0696 (citing, e.g., Appx4372-4379, 131:25-138:13; Appx4410-4413, 169:25-172:1). It was error for the Board to ignore this evidence.

Stern drives as taught by Brandt are complex systems in which any adjustment of one variable can affect the performance of the entire system. Appx4171, ¶ 78; Appx4064-4065, ¶ 90; Appx4065-4066, ¶ 92. For example, in order to rotate the lower unit of Brandt as Brunswick proposed, the geometry of the lower unit as a whole would have required almost a complete redesign (including the cross-sectional shape of the foil to have an elliptical shape leading edge and a tapered trailing edge for efficiency). Brunswick's expert conceded this. Appx4057-4058, ¶ 79; Appx4377, 136:17-19. Additionally, the configuration and routing of other systems and components such as cooling water ducts, exhaust ducts, and gearshift

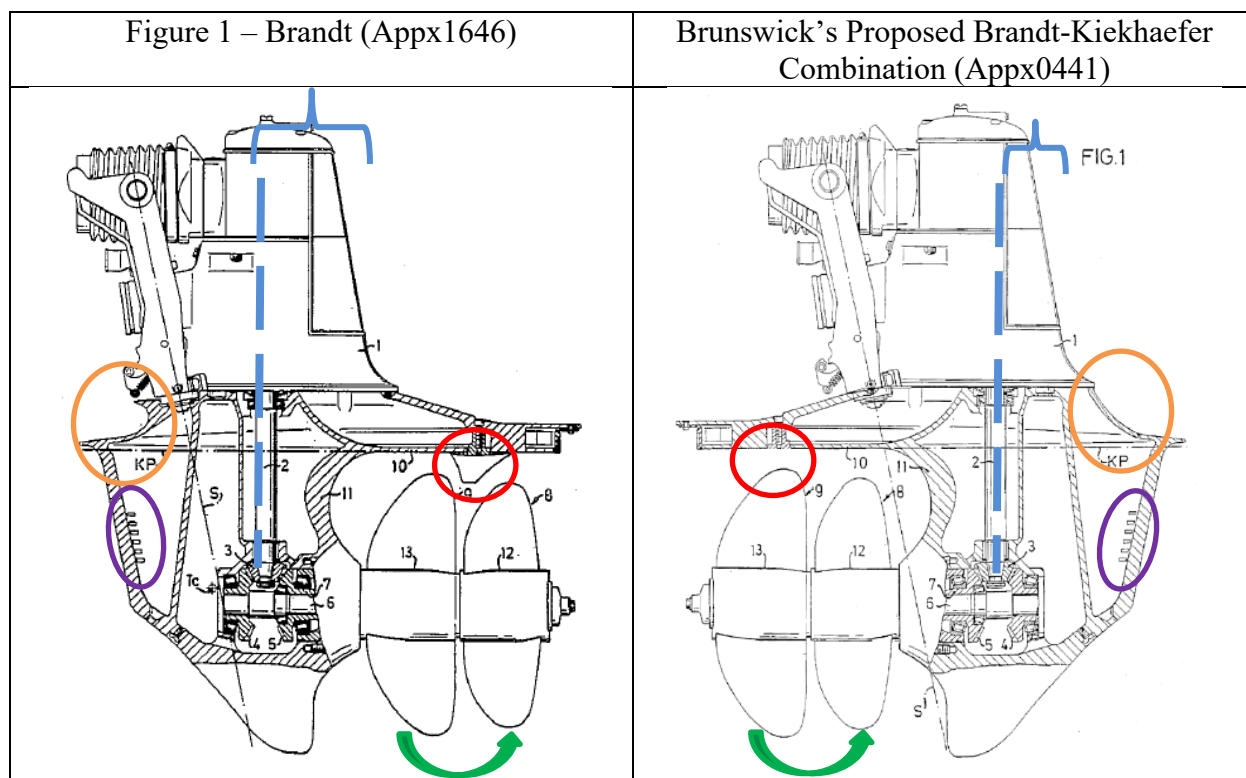
cables would have needed to be reconfigured and redesigned. Appx4064-4065, ¶ 90; Appx4060-4063, ¶ 84-87. In essence, the lower unit (and consequently the entire drive) would have needed to be reconfigured, redesigned, and optimized for this entirely new application – these are not “minor modifications.” Appx4064-4065, ¶ 90. Thus, in order to achieve the purposes of Brandt in optimizing the geometry and location of the steering axis to optimize effects of steering forces (Appx1648, 1:63-2:3), substantial reconfiguration of the drive would have been required. Appx4058, ¶ 80; Appx4058-4059, ¶ 81; Appx4062, ¶ 85; Appx4063, ¶ 87.

Such a substantial reconfiguration cannot support obviousness. *In re Ratti*, 270 F.2d 810, 813 (C.C.P.A. 1959) (holding the suggested combination of references improper under §103 because it “would require a substantial reconstruction and redesign of the elements shown in [a prior art reference] as well as a change in the basic principles under which [that reference’s] construction was designed to operate”); *see also Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 F. App’x 755, 758 (Fed. Cir. 2015) (same); *In re Gardner*, 449 F. App’x 914, 916 (Fed. Cir. 2011) (same).

The Board dismissed this argument on the sole basis that each of the requisite modifications was “within the scope of the knowledge of one of ordinary skill in the art.” Appx0056. The Board missed the point. Regardless whether each modification individually was within the skillset of a skilled artisan, the vast number of complex

modifications, and the enormous complexity of making the dozens of modifications, as a collective, to arrive at the claimed invention, does not support a finding of obviousness because it goes directly to whether a person of ordinary skill in the art would have been motivated to combine the two references. *See, e.g., Application of Hoeksema*, 379 F.2d 1007, 1011 (C.C.P.A. 1967), *on reh’g*, 399 F.2d 269 (C.C.P.A. 1968) (acknowledging that “complexity may be a factor in determining the obviousness of [a claim]”); *cf. Ortho-McNeil Pharm., Inc. v. Mylan Lab’ys, Inc.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008) (faulting expert for improperly employing hindsight bias when he discounted the “number and complexity” of the alternative solutions available). The Board’s summary dismissal of this argument as irrelevant further reflects its reliance on hindsight bias and is unsupported by substantial evidence.

A comparison of the relied-upon figure of Brandt and Brunswick’s hypothetical drive based on the combination of Brandt and Kiekhäfer illustrates the weakness of Brunswick’s position and the lack of support for the Board’s finding.



Appx0691.

The comparison shows the following changes which would have been required: (a) shifting the position of the vertical drive shaft (relative to aft or trailing edge upper gear case) (blue dashed line and bracket); (b) removal of fin structure (red ellipses); (c) modification of trailing edge above cavitation plate (orange ellipses); and (d) changing relative position of propellers (i.e., propeller 13 is closer to the drive shaft in Brandt and switched to the outside propeller in the combination) (green arrow); and (e) the cooling water inlets would need to be relocated to a different position, as they would not function as intended being located on the trailing edge of the foil in the proposed Brandt-Kiekhaefer combination (purple

ellipses). Appx4060-4061, ¶ 84. And these are just the visible adjustments as numerous other modifications would be required (some of which are described herein), for example, an adjustment of the length of the horizontal input shaft that couples with the engine output would be required, which would require the position of gears, bearings, and carriers to be adjusted and reconfigured, which in turn may affect the position of any cooling water and exhaust ducts throughout the gear case. Appx4062, ¶ 85.

Moreover, Brunswick's own expert identified over two dozen changes—that he attempted to explain away as “minor modifications”—and different considerations that a POSITA would consider when making this hypothetical combination of Brandt and Kiekhaefer. Appx4372-4379, 131:25-138:13; Appx4410-4413, 169:25-172:1. Highlights of these changes include:

- flipping the lower unit around 180 degrees using the bolting flange as a basis for the reversal of the lower unit (Appx4373, 132:22-23; Appx4374, 133:22-24);
- shifting the vertical drive shaft aft with the reversal of the lower unit (Appx4375, 134:11-15);
- shifting the vertical drive shaft (in upper part of the housing) that mates with the horizontal shaft coming from the gimbal joint in the engine aft (Appx4376, 135:3-5);

- shifting a bevel gear at the end of the horizontal shaft aft (Appx4376, 135:6-7),
- extending the shaft from universal joint to move the bearing aft (Appx4378, 137:19-20);
- shifting the drive housing aft in order to maintain the same forward and aft distance on the bolting plate (Appx4410,169:13-18);
- increasing the horizontal width of the housing (Appx4378, 137:21);
- pushing back the trailing edge of the upper gear case to accommodate the upper bearing location for horizontal to vertical bevel gear (Appx4378, 137:21-25);
- shifting of the position of carrier bearing aft of the bevel gear or leaving it forward of the bevel gear (Appx4410-4411, 169:19-170:4);
- removing the cathodic protection fin between the propellers (Appx4376, 135:16);
- adjusting the relative position of the propellers (i.e., propeller 13 of Brandt positioned farther from the vertical drive shaft) (Appx4376, 135:19-21; Appx4377, 136:3-4);
- replacing the propellers of Brandt with propellers having nonexhaust ports through the hubs (Appx4412, 171:7-8)

- modifying the drive to put an exhaust vent out of the trailing edge of the lower unit (Appx4377, 136:5-6);
- rotating the fin (Appx4377, 136:9);
- adjusting the propeller shaft longer so the fin does not interfere with the operation of the propellers and propeller location (Appx4377, 136:9-11);
- reversing or altering the shape of leading edges of the lower housing for better hydrodynamics (Appx4377, 136:17-19);
- reversing the bottom fin to curve backwards instead of forward (Appx4377, 136:20-21);
- reshaping the lower fin for better hydrodynamics via experimental usage with aluminum-filled epoxy resin (Appx4377-4378, 136:23-137:1);
- grinding off the cavitation plate which “has a terrible shape” as configured in his Brandt-Kiekhäfer combination and changing its shape (Appx4378, 137:12-16; Appx4412, 171:2-5);
- welding a big horizontal plate on the drive (Appx4378, 137:12-16);
- acknowledging that the water inlet ports are not in the most optimal location (Appx4379, 138:4-5);
- changing the water pick-up ports (Appx4412, 171:17-18);
- rerouting the water pipes (Appx4412, 171:15-17);
- putty-ing out the nose (Appx4411, 170:24);

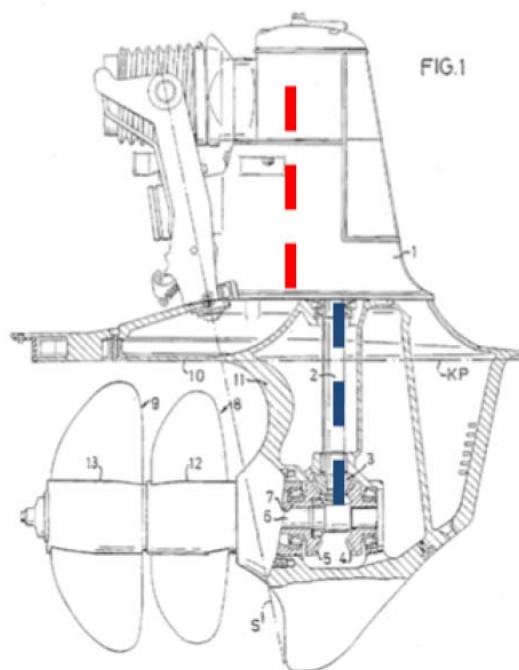
- adjusting the leading edge of the hydrofoil or the section through each of the fin sections to make the leading edge blunt and the trailing edge sharper to minimize its resistance (Appx4411-4412, 170:24-171:2); and
- rerouting the exhaust pipes not through the propeller hubs and instead route the exhaust pipe down and pick an exit point on the trailing edge (Appx4412, 171:18-20).

Despite this vast list of required changes, Brunswick's expert suggested that "these are fairly easy design changes that anybody in the shop could do if they put their mind to it." Appx4379, 138:1-3. However, whether such a person could make all of these changes is not the requisite inquiry; whether each of these modifications in isolation can be carried out by a shop technician is irrelevant. The numerous changes required to combine the two references to arrive at the claimed invention confirm the complexity of the proposed modification and demonstrate that there would have been no motivation to combine. Appx4064-4065, ¶ 90. The Board's failure to consider this evidence as part of its obviousness analysis is error. "The ultimate determination of whether an invention would have been obvious is a legal conclusion based on the totality of the evidence . . . including underlying factual inquiries such as: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." *Brown & Williamson Tobacco*,

229 F.3d at 1124 (citing *Richardson–Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1483 (Fed. Cir. 1997); *see also Graham*, 383 U.S. at 17–18; *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999), *abrogated on other grounds by In re Gartside*, 203 F.3d 1305, (Fed. Cir. 2000).

4. The Board Also Ignored the Complexity of Shifting the Vertical Drive Shaft of Brandt to Create Brunswick’s Hypothetical Drive.

Similarly, the Board ignored that at least one of the modifications to Brandt (which Brunswick concedes would have been required) would have resulted in a substantial reconfiguration of the Brandt stern drive. Brunswick’s hypothetical forward-facing drive shows a vertical drive shaft shifted in an aft or rear direction as compared to original Figure 1 in Brandt. Appx0441. However, such a shift would not be operable without substantial reconfiguration of the drive described in Brandt. Appx4058-4062, ¶¶ 81-85. Brunswick made no attempt to illustrate or describe the inner workings of its hypothetical drive. To do so would have been impossible. For example, the geometry of the upper housing would not permit the vertical drive shaft to be positioned where Brunswick suggests in its hypothetical figure. Appx4062, ¶ 85. In fact, based on Brunswick’s image at Appx0441, the upper portion of the vertical drive shaft (position shown below in red in its original position) would not be aligned with the lower portion of the drive shaft that Brunswick made up (position shown in blue).



Brandt-Kieckhafer Combination

Appx4059-4060, ¶ 82. Further, the appropriate gears and input drive shafts would have had to be redesigned and reconfigured in order to accommodate this hypothetical drive proposed by Brunswick. Appx4062, ¶ 85; Appx4066-4068, ¶¶ 93-95. Additionally, cooling water ducts, exhaust ducts, leading edges, trail edges, and foil shape are just a few of the additional components that would require reconfiguration to create Brunswick's hypothetical drive. Appx4064-4065, ¶ 90. Brunswick ignored these requirements, and the Board failed to consider them in reaching its conclusions.

Further, contrary to Brunswick's assertions, these are anything but "minor modifications." *Id.* In fact, as shown above, such a modification as proposed by

Brunswick would cause the Brandt drive to be inoperable or destroy its intended function as well as cause it to be unsatisfactory for its intended purpose – that is providing a stern drive unit that reduces the effect of the transverse forces on the steering torque exerted on the drive unit. Appx1648, 2:60-64; Appx4065, ¶ 91. If a proposed modification would render the prior art being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *See, e.g., In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984). Similarly, if a proposal for modifying the prior art in an effort to attain the claimed invention causes the art to become inoperable or destroys its intended function, then the requisite motivation to make the modification would not have existed. *See In re Fritch*, 972 F.2d 1260, 1265 n.12 (Fed. Cir. 1992) (“[A] proposed modification [is] inappropriate for an obviousness inquiry when the modification render[s] the prior art reference inoperable for its intended purpose.”). The evidence demonstrates that the proposed modification would not have been obvious. Moreover, the Board’s failure to consider this evidence as part of its obviousness analysis was error.

5. The Board Also Ignored That Brunswick Tried and Failed in Its Own Attempt at the Proposed Modification.

Brunswick, with the patent as a roadmap and using one of Volvo Penta’s own Brandt stern drives as a starting point, attempted to physically implement the modifications it asserted were obvious. Brunswick failed. The Board ignored this additional evidence of non-obviousness, which is also error. *See, e.g., Gordon*, 733

F.2d at 902 (finding proposed modification inappropriate for an obviousness inquiry when the modification rendered the prior art reference inoperable for its intended purpose).

In an attempt to demonstrate that its “proposed modifications are well within the knowledge of a PHOSITA,” Brunswick purchased a Volvo Penta Duoprop drive, a commercial embodiment of Brandt, and had its Vice President of Engineering attempt to reverse the propellers as taught in the ’692 Patent. Appx0751. The result of Brunswick’s effort—the “Crusty Drive”—was indisputably *inoperable* for its intended purpose—to propel a boat through the water. The Crusty Drive included multiple gaps and unfilled holes forcing Brunswick’s Vice President of Engineering to admit that it would be a “bad idea” if the drive were used in water. *See, e.g.*, Appx4859-4862, 33:7-36:12. It is unsurprising that Brunswick never installed the Crusty Drive on a boat, connected it to an engine, steering or trim system, installed propellers on the drive, or performed any significant testing. Appx4853, 27:5-7, Appx4855-4856, 29:13-30:8.



Appx4822; Appx4826.

Brunswick’s Crusty Drive demonstration clearly rebuts its assertion that rotating the lower gear case 180 degrees would have been a “simple and routine” modification. The Board again dismissed these indisputably relevant facts, finding that “a working demonstration (or ‘proof of concept’) . . . of the proposed modification is *not necessary* to support a conclusion of obviousness.” Appx0063 (emphasis in original). Whether necessary or not is beside the point, it was error for the Board to refuse to consider that Brunswick did in fact attempt the modification on which Brunswick’s entire argument relied and failed to do so successfully even with the benefit of both the teachings and a fully-functional commercial embodiment of the ’692 Patent. Brunswick introduced this evidence into the record, and Brunswick’s failure to implement the very modification on which their argument depends is strong evidence of non-obviousness. *Gordon*, 733 F.2d at 902; *see also McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1354 (Fed. Cir. 2001) (finding

that, if a proposed modification based on two references “produces[] a ‘seemingly inoperative device,’ . . . such references teach away from the combination and thus cannot serve as predicates for a prima facie case of obviousness.”).

6. The Evidence Demonstrates the Non-Obviousness of the '692 Patent.

The Board’s conclusion should be reversed based on the totality of the evidence of record. *See Brown & Williamson Tobacco*, 229 F.3d at 1124 (holding ultimate determination of obvious is “a legal conclusion based on the totality of the evidence.”). Moreover, the Board ignored critical facts, highly relevant to the non-obviousness of the '692 Patent. The Board ignored that Brunswick, despite possessing its primary prior art reference Kiekhäfer for more than 70 years, never attempted the proposed modification. The Board ignored the nearly complete redesign the asserted combination would require. And perhaps most compelling, the Board ignored that Brunswick’s own attempt—for purposes of its invalidity challenge—to physically implement the combination it proposed, utterly failed to operate for its intended purpose. This evidence demonstrates that the combination on which the Board relied would not have been obvious, and the Board’s refusal to consider this evidence is error.

C. The Board’s Evaluation of the Evidence of Secondary Considerations of Non-Obviousness Was Legally Erroneous.

1. The Law Concerning Secondary Considerations of Non-Obviousness

In the mechanical arts, especially for seemingly simple inventions, objective indicia are often the best indicators of non-obviousness. Objective evidence helps to avoid falling into the trap of hindsight. *See van Veen v. United States*, 386 F.2d 462, 465 (1967) (acknowledging that “[e]xperience has shown that some of the simplest advances have been the most nonobvious,” reviewing evidence of secondary considerations of non-obviousness, and then determining the claims non-obvious based thereon).

Objective evidence “may often establish that an invention appearing to have been obvious in light of the prior art was not.” *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012). In fact, “[i]t is the secondary considerations that are often most probative and determinative of the ultimate conclusion of obviousness or nonobviousness.” *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996). This is because “[o]bviousness requires a court to walk a tightrope blindfolded (to avoid hindsight)—an enterprise best pursued with the safety net of objective evidence.” *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1379 (Fed. Cir. 2012).

Here, the objective indicia of non-obviousness is compelling and overwhelms any prima facie obviousness (which was never established in any event).

Further, the manner in which objective evidence is evaluated is vitally important. Objective evidence of non-obviousness is part of the overall obviousness analysis, not just an afterthought. *See In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1075-76 (Fed. Cir. 2012). Objective indicia play a critical role because they are “not just a cumulative or confirmatory part of the obviousness calculus but constitute[] independent evidence of nonobviousness[,]” *Ortho-McNeil Pharm., Inc.*, 520 F.3d at 1365, and “***can be the most probative evidence of non-obviousness in the record, and enables the . . . court to avert the trap of hindsight.***” *Crocs, Inc. v. Int’l Trade Comm’n*, 598 F.3d 1294, 1310 (Fed. Cir. 2010) (emphasis added) (citation omitted).

Objective evidence of non-obviousness includes: (1) commercial success, (2) copying, (3) industry praise, (4) skepticism, (5) long-felt but unsolved need, and (6) failure of others. *See, e.g., Transocean Offshore Deepwater Drilling*, 699 F.3d at 1349-56. To be relevant, evidence of non-obviousness must be commensurate in scope with the claimed invention. *See In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011). To be accorded substantial weight, there must be a nexus between the merits of the claimed invention and the objective evidence. *See GPAC*, 57 F.3d at 1580. Nexus is a legally and factually sufficient connection between the objective evidence

and the claimed invention, such that the objective evidence must be considered in determining non-obviousness. *See Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988).

There is a presumption of nexus applicable for objective indicia when the patent owner shows that the asserted objective evidence is tied to a specific product and that product “embodies the claimed features, and is coextensive with them.” *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018). Further, “[w]here the allegedly obvious patent claim is a combination of prior art elements, . . . the patent owner can show that it is the claimed combination as a whole that serves as a nexus for the objective evidence; proof of nexus is not limited to only when objective evidence is tied to the supposedly ‘new’ feature(s).” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1330 (Fed. Cir. 2016). When a nexus is presumed, “the burden shifts to the party asserting obviousness to present evidence to rebut the presumed nexus.” *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000). “The presumed nexus cannot be rebutted with mere argument; evidence must be put forth.” *See id.*

2. The Board’s Apparent Discounting of Volvo Penta’s Proffered Evidence of Secondary Considerations of Non-Obviousness Is Not Supported by Substantial Evidence.

Evidence of each secondary consideration must be considered as part of the “‘totality of the evidence’ that is used to reach the ultimate conclusion of

obviousness.” *Richardson–Vicks*, 122 F.3d at 1483. *See also In re Depomed, Inc.*, 680 F. App’x 947, 956 (Fed. Cir. 2017) (Reyna, J. concurring) (faulting the Board for assigning evidence of secondary considerations “little weight” because (1) “results are either unexpected or they are not,” and (2) “assigning weight to objective indicia of nonobviousness imposes the . . . danger of burden-shifting”). And the Board must explain its rationale. *See, e.g., Rovalma, S.A. v. Bohler-Edelstahl GmbH & Co. KG*, 856 F.3d 1019, 1025 (Fed. Cir. 2017) (remanding in view of the Board’s failure to sufficiently explain its decision, and indicating “[w]e have repeatedly insisted on such explanations in reviewing the adequacy of the Board’s analysis—both as a matter of obviousness law and as a matter of administrative law”).

While the Board’s final written decision in this case purported to address Volvo Penta’s objective indicia of non-obviousness, the Board’s assigning either “some weight” or “some, but not considerable, weight” to each of the indicia is not supported by substantial evidence. It also renders the Board’s overall determination of obviousness impenetrable as it is impossible to determine how the Board combined the various weights it accorded to each of the indicia. *See Pers. Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 992 (Fed. Cir. 2017) (“Critically, in order to ‘allow effective judicial review, . . . the agency is obligated to ‘provide an administrative record showing the evidence on which the findings are based,

accompanied by the agency's reasoning in reaching its conclusions.” (alterations in original) (citation omitted)).

For instance, is “some weight” greater than or less than “some, but not considerable, weight”? Or are they the same? And what effect on the obviousness analysis do separate and independent indicia of non-obviousness that are each entitled to “some weight” each have? The Board offers no clues. And the Board's failure to provide any explanation is error. *Pers. Web Techs.*, 848 F.3d at 993 (remanding in view of the Board's failure to “sufficiently explain and support [its] conclusions”). The Board's failure to explain how this evidence affected its final determination of obviousness deprives the parties and the Court of any ability to meaningfully review the Board's final conclusions. *See In re Sang Su Lee*, 277 F.3d 1338, 1342 (Fed. Cir. 2002) (“For judicial review to be meaningfully achieved within these strictures, the agency tribunal must present a full and reasoned explanation of its decision. The agency tribunal must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts.”). Further, to the extent the Board is ascribing “little weight” to each of the indicia, the Board's decision is not supported by substantial evidence and should be reversed.

a) The Board Appears to Have Improperly Discounted Copying by Brunswick to Find Obviousness

Perhaps the most troubling example of the Board's error is with respect to Brunswick's copying of Volvo Penta's innovative stern drive. The Board recognized that Brunswick's internal documents identified its objective of delivering a product to activity the Volvo Penta Forward Drive. Appx1294. In support of that objective, Brunswick bought and analyzed a Forward Drive as part of its development of its own forward-facing stern drive. Appx0074-0075; Appx1295. Brunswick couched this as activity it coined "benchmarking," but the Board found "[t]he record supports that the 'benchmarking' process by Petitioner was more akin to 'copying' than to a mere assessment of a competitor's products." Appx1297.

Despite finding *actual copying*, however, the Board's conclusion on the 'copying' factor indicates only that the evidence in support thereof was "entitled to *some weight* of nonobviousness" Appx1299 (emphasis added). Without an explanation, it is impossible to evaluate the Board's ultimate determination of obviousness. *See, e.g., Pers. Web Techs.*, 848 F.3d at 993 (remanding in view of the Board's failure to "sufficiently explain and support [its] conclusions"); *In re Nuvasive, Inc.*, 842 F.3d 1376, 1385 (Fed. Cir. 2016) (same); *see also Rovalma*, 856 F.3d at 1026 ("The Board has not provided a sufficiently focused identification of the relevant evidence or explanation of its inferences for us to confidently review its decision and avoid usurping its fact-finding authority.").

For example, if by “some weight,” the Board means “no weight,” then the Board’s conclusion is not based on substantial evidence and should be reversed. If the Board instead meant “little weight,” then the Board inappropriately dismissed Brunswick’s copying in the overall determination, which again is not supported by substantial evidence. Misappropriation, which the Board found occurred, is strong evidence of non-obviousness. *See, e.g., Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 1099 (Fed. Cir. 1985), *cert. granted, judgment vacated on other grounds*, 475 U.S. 809 (1986) (“That Dennison, a large corporation with many engineers on its staff, did not copy any prior art device, but found it necessary to copy the cable tie of the claims in suit, is equally strong evidence of nonobviousness.”). At a bare minimum, the Board’s “some weight” conclusion deprives both the parties and this Court of any ability to conduct a meaningful review of the Board’s consideration of Brunswick’s copying, either in isolation or collectively with the evidence of the other secondary considerations of non-obviousness presented. Either way, this was error.

b) The Board Also Appears to Have Improperly Discounted Extensive Evidence of Commercial Success

Turning to commercial success, as further example of the Board’s error in its analysis of secondary considerations, the Board acknowledged evidence that Volvo Penta’s “Forward Drive essentially created a new market for stern drives,” “that this new market for wake surfing has been **market assessment**,” and

“that sales of the ‘Forward Drive have increased significantly since its launch in 2015.’” Appx0078-0079; Appx1299-1300. The Board also agreed the record shows that “more and more boat builders are offering the Volvo Penta Forward Drive as original equipment, including boats specifically designed to incorporate the Forward Drive,” and that Brunswick was even feeling pressure from its own customers in this market. Appx0079; Appx1300.

However, despite this compelling evidence of commercial success, the Board, as with its analysis of the copying factor, failed to provide any meaningful explanation of how much weight it was according the evidence of commercial success. The Board concluded, in a single sentence, only that it “view[ed] the evidence ... as entitled to *some weight* of nonobviousness based on commercial success.” Appx1302. The Board’s “some weight” conclusion, again, appears to inappropriately discount this factor in the overall consideration, or at least deprives the parties and the Court of any ability to meaningfully review the Board’s consideration of this evidence in the non-obviousness evaluation.

c) The Board Also Appears to Have Improperly Discounted Extensive Evidence of Industry Praise.

The Board’s review of Volvo Penta’s evidence of “industry praise” fares no better. The Board acknowledged “numerous” trade publication exhibits that “provide praise for the Forward Drive,” including “mentioning its forward-facing propellers, as claimed in the ’692 patent.” Appx1302. But without any explanation

whatsoever, the Board concluded it “view[ed] the laudatory praise of [the Forward Drive] in trade publications as entitled to *some, but not considerable, weight* of nonobviousness.” Appx0081. The Board also acknowledged that the Forward Drive won the “Innovation Award at the 2015 Miami International Boat Show.” Appx1303. Again, without any explanation, the Board stated it “view[ed] the Innovation Award as entitled to *some, but not considerable, weight* of nonobviousness.” Appx0082. Lastly, the Board reviewed Brunswick’s internal documents and concluded that it “view[ed] the cited statements in Petitioner’s internal documents as entitled to *some, but not considerable, weight* of nonobviousness.” Appx0083.

The only inference for the Board’s apparent discounting of the evidence of industry praise is that some of the evidence either, in part, discusses “unclaimed features,” or discussed the product more generally than with respect to claimed features. Appx0083. But, as the Board itself recognized, “the objective evidence need not be limited to solely the allegedly novel aspect(s).” Appx1302. Thus, there was no reasonable basis for the Board’s apparent discounting of the evidence of industry praise. And in any event, the Board’s “some, but not considerable, weight” conclusion, like for the other factors discussed above, provides neither the parties nor the Court any meaningful ability to review the Board’s decision. *See Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 873 (Fed. Cir. 1985), *overruled on other*

grounds by Nobelpharma AB v. Implant Innovations, Inc., 141 F.3d 1059 (Fed. Cir. 1998) (remanding for a reasoned consideration and weighing of the evidence of secondary considerations, stating “we must be convinced from the opinion that the district court actually applied *Graham* and must be presented with enough express and necessarily implied findings to know the basis of the trial court’s opinion.”).

d) The Board Also Appears to Have Improperly Discounted Evidence of Skepticism, Long-Felt But Unsolved Need, and Failure of Others.

The Board’s review of Volvo Penta’s evidence of the secondary considerations of skepticism, long-felt but unsolved need, and failure of others was similarly lacking. The Board accorded Volvo Penta’s evidence relevant to each of these factors “very little weight.” Appx0085; Appx0086; Appx0088. However, despite ascribing these factors some weight, the Board apparently either disregarded them entirely, or considered them without any reasoning on the record, in its collective weighing.

The Board’s “very little weight” conclusion is contrary to the evidence presented, particularly Brunswick’s reluctance to enter this market until after witnessing Volvo Penta’s invention and resultant success. Appx4522; Appx4523; Appx4543. But, as with its treatment of the other evidence of secondary considerations, the Board’s failure to explain how this evidence affected its final

determination of obviousness deprives the parties and the Court of any ability to meaningfully review the Board's final conclusions.

3. The Board Failed to Conduct a Reasoned Collective Weighing of the Evidence of Secondary Considerations of Non-Obviousness.

The Board's conclusion concerning obviousness is also legally erroneous for a *second* reason. The Board failed to conduct any analysis whatsoever concerning any *collective* weighing of the evidence presented concerning secondary considerations of non-obviousness. Instead, the Board, *in a single sentence*, stated only that "Patent Owner's objective evidence weighs *somewhat in favor* of nonobviousness." Appx0088. The Board provided no reasoning for this vague finding that would otherwise enable the parties or the Court to evaluate the soundness of its finding.

Compounding this error, the Board additionally failed to provide any reasoning with respect to its weighing the evidence of secondary considerations against Brunswick's evidence of obviousness. Again, the Board, *in a single sentence*, stated only that "[w]hen considering all the evidence of obviousness and nonobviousness together . . . , we find Petitioner's strong evidence of obviousness outweighs Patent Owner's objective evidence of nonobviousness." Appx0088. Moreover, the Board never made any finding, let alone any reasoned finding, that Brunswick's evidence of obviousness was "strong." All of this too was legal error.

For the foregoing reasons, if the court does not reverse the Board’s decision, the Court should remand it to the Board for a fulsome consideration, on the written record, of the evidence of secondary considerations of non-obviousness. *See Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1340 (Fed. Cir. 2016), *overruled on other grounds by Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1340 (Fed. Cir. 2017) (“We must therefore remand for the Board to examine Nike’s evidence and its impact, if any, on the Board’s analysis under the first three *Graham* factors.”); *see also Loctite*, 781 F.2d at 873 (“[W]e must be convinced from the opinion that the district court actually applied *Graham* and must be presented with enough express and necessarily implied findings to know the basis of the trial court’s opinion.”).

4. The Board Erred by Failing to Consider the Evidence of Secondary Considerations of Non-Obviousness as Part of the Totality of the Evidence of Non-Obviousness.

This Court has repeatedly stated that secondary considerations of non-obviousness are vital to an obviousness determination, not evidence to be ignored or mentioned as a mere afterthought. *See, e.g., Leo Pharm. Prods.*, 726 F.3d at 1357 (“Whether before the Board or a court, this court has emphasized that consideration of the objective indicia is part of the whole obviousness analysis, not just an afterthought.”); *Stratoflex v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983) (“[E]vidence rising out of the so-called ‘secondary considerations’ must always when present be considered en route to a determination of obviousness.”). Such

evidence is an important safeguard against hindsight bias. *Graham*, 383 U.S. at 36 (secondary considerations “may also serve to ‘guard against slipping into use of hindsight,’ and to resist the temptation to read into the prior art the teachings of the invention in issue”) (citation omitted); *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1052 (Fed. Cir. 2016) (recognizing that secondary considerations guard against hindsight bias). Evidence of secondary considerations “may often be the most probative and cogent evidence in the record.” *Stratoflex*, 713 F.2d at 1538; *see also* MUELLER ON PATENT LAW § 9.02[C][2][b] (2012) (noting that the four *Graham* factors, including secondary considerations, “have come to be essential to every nonobviousness analysis”).

And secondary considerations cannot be an afterthought. This Court has held that district courts may not employ a two-step burden-shifting scheme in an obviousness analysis. *Cyclobenzaprine*, 676 F.3d at 1075. In *Cyclobenzaprine*, the district court erred by making an obviousness determination before considering the patentee’s secondary considerations of non-obviousness. This Court noted that a fact finder must “consider all evidence relating to obviousness before finding a patent invalid on those grounds.” *Id.* Failure to do so results in an impermissible burden-shifting scheme for which there is “no practical need.” *Id.* at 1080 n.7.

In this case, the evidence demonstrates that the Board instead ignored evidence of nonobviousness and thus employed such a burden-shifting scheme.

Appx0027-0064. Specifically, prior to any consideration of evidence of secondary considerations of non-obviousness, the Board stated “we determine, **in light of the complete record**, that Petitioner has shown by a preponderance of the evidence” the claims to be obvious. Appx0063 (emphasis added). But the Board did **not** consider the complete record; only later, did it consider Volvo Penta’s secondary considerations of non-obviousness. Appx0065-0088; Appx1285-1309. Deferring consideration of objective considerations until after deciding a claim would have been obvious allows hindsight bias to creep into step one (the *prima facie* showing) and limits the meaningfulness of step two. *Depomed*, 680 F. App’x at 955 (Reyna, J. concurring). And as discussed at length, the Board then compounded its error by failing to address all of Volvo Penta’s secondary considerations. This was error.

The totality of the evidence here, properly considered, presents a compelling case of non-obviousness. Brunswick patented the outboard motor of Kiekhaefer nearly 70 years ago, yet failed to commercialize a tractor type drive of its own design. Appx4520-4530. Decades passed without anyone else in the industry successfully releasing a forward-facing stern drive. Industry participants witnessed the challenges of doing so, as evidenced, not the least, by the testimony of Brunswick’s own expert Mr. Schofield and by Brunswick’s failure to implement the proposed combination, even for the limited purposes of supporting its IPR. Volvo

Penta then innovates and releases its Forward Drive, achieving commercial success and receiving universal industry acclaim.

Years after Volvo Penta's innovation, Brunswick, rather than applying the teachings of its Kiekhaefer reference, copies Volvo Penta's Forward Drive for the design of Brunswick's Bravo Four S. Then, concurrently with the commercial release of its infringing drive, Brunswick challenges the '692 Patent based on its 70-year old Kiekhaefer outboard motor and a Volvo Penta stern drive patent, Brandt, issued more than 30 years ago. And its argument that the claims are obvious relies entirely on a single statement in its own 70-year old reference regarding "speed and efficiency." The only conclusion that is supported by the totality of evidence is that the claims are patentable.

D. The Board's Finding of No Nexus Between the Evidence of Secondary Considerations of Non-Obviousness and the Claimed Invention Was Not Supported by Substantial Evidence.

1. Substantial Evidence Does Not Support the Board's Determination That Volvo Penta Was Not Entitled to a Presumption of Nexus.

The Board's determination that Volvo Penta was not entitled to a presumption of nexus hinged on its erroneous determination that Volvo Penta had not established that its Forward Drive was "coextensive" with the claims of the '692 Patent. Appx1286-1289. As a preliminary matter, the Board's reasoning *nowhere* references any element of the claims of the '692 Patent. This error alone requires at

least remanding to the Board, as the coextensiveness inquiry is with respect to the claims of the patent. *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1367 (Fed. Cir. 2019). Volvo Penta presented arguments and supporting evidence that the Volvo Penta’s Forward Drive commercial product was coextensive with the claims. Appx4040-4041, ¶ 51. There is no evidence, other than marketing statements, that the Forward Drive is not coextensive with the claims of the ’692 Patent, and certainly not evidence that a “critical” unclaimed feature is in a different Volvo Penta patent and a feature that materially impacts the Forward Drive’s functionality. *Fox Factory*, 944 F.3d at 1375 (“A patent claim is not coextensive with a product that includes a ‘critical’ unclaimed feature that is claimed by a different patent and that materially impacts the product’s functionality”)

In fact, the Board’s determination related to coextensiveness is based on arguments presented in a single footnote that Brunswick includes as an afterthought in its Reply Brief. Appx0757 n.4. The reliance on an argument in a footnote—which fails to identify affirmative evidence showing that the product is not coextensive and instead only relies on marketing statements—further illustrates the Board’s obviousness conclusion was preordained and driven by hindsight bias.

Additionally, the Board improperly rejected all of Volvo Penta’s evidence that the Volvo Penta Forward Drive is a commercial embodiment of the ’692 Patent and coextensive with the claims. Appx0066. Specifically, the Board rejected argument

based on the testimony of multiple witnesses, including Volvo Penta's expert Dr. Winkel's testimony concerning claim embodiment and coextensiveness. Appx4040-4041, ¶ 51 (Winkel); *see also* Appx4493, ¶ 9 (Sweet). The Board suggested, without deciding, that Volvo Penta's reliance on Dr. Winkel may have been an improper incorporation by reference, but regardless, the Board appears to have entirely dismissed Dr. Winkel's testimony, among all other evidence, based on that belief. *Id.* This was improper.

First, the Board ignored *Brunswick's own concession* that Volvo Penta's Forward Drive is an embodiment of the '692 Patent. *Id.* Brunswick admitted this fact multiple times at the Oral Hearing. Appx1153, 59:15-25; Appx1211, 117:10-25. *Second*, Volvo Penta argued and supplied ample evidence in the form of written expert testimony that its product embodies the claims of the '692 Patent. Appx4040-4041, ¶ 51 (citing Appx4096-4111). The Board then decided, after the fact, that Volvo Penta needed to bodily incorporate some undisclosed amount of that evidence into its briefing. Appx0066. In fact, the parties' dispute primarily focused on claim 1. For claim 1, the complained of "incorporation by reference" of information included in an appendix to Volvo Penta's expert declaration is a total of one page. *See* Appx4907. Excluding an argument on its reference to a single page of evidence without articulating any objective standard for doing so under 37 C.F.R. § 46.3 is arbitrary and an abuse of discretion. *See Pers. Web Techs.*, 848 F.3d at 992 ("We

review the Board’s IPR decisions to ensure that they are not “arbitrary, capricious, an abuse of discretion”). There was no prejudice to Brunswick, as it had notice of Volvo Penta’s position and presented evidence in rebuttal argument through its Reply brief or during the oral hearing. Brunswick conceded the issue. Appx1153, 59:15-25; Appx1211, 117:10-25. And even after such express concessions, the Board arbitrarily ignored the evidence; this is error. *See Everstar Merch. Co. v. Willis Elec. Co.*, No. 2021-1882, 2022 WL 1089909, at *4 (Fed. Cir. Apr. 12, 2022) (remanding in view of the Board’s refusal to consider certain argument and evidence, given the objecting party had notice and an opportunity to respond). *Third*, additional arguments and supporting evidence was submitted by Volvo Penta (Appx0923-0925; Appx3711-3713; Appx4502-4503; Appx1757), but the Board ignored the proffered evidence (Appx0072 n.19).

Moreover, the Board’s determination to discredit Volvo Penta’s evidence of co-extensiveness hinged on a single statement in an issue of “Volvo Group magazine,” that the Forward Drive “includes several patented features that make the drive stand out,” and the fact that the issue of the magazine published prior to the issuance of the ’692 Patent. Appx0067 (citing Appx1735). Then, without any evidentiary support, the Board concluded such features “‘materially impact[]’ the Forward Drive’s functionality,” and thus defeat Volvo Penta’s evidence of co-

extensiveness. The Board’s conclusion lacked substantial evidence support. Appx0067.

As an initial matter, the presumption of nexus applies when the relevant commercial product is “the invention disclosed and claimed in the patent.” *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997). “***This is true even when the product has additional, unclaimed features.***” *PPC Broadband, Inc. v. Corning Optical Commc’ns RF, LLC*, 815 F.3d 734, 747 (Fed. Cir. 2016) (emphasis added); *see also WBIP*, 829 F.3d at 1331 (“[Patentee] was entitled to the presumption of nexus for its objective evidence of non-obviousness because it established that the specific products . . . are embodiments of the invention in the asserted claims.”); *Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1378 (Fed. Cir. 2000) (applying presumption even through commercial embodiment had unclaimed mobility feature).

The facts here are very much like those this Court recently reviewed in *Oren Technologies, LLC v. Proppant Express Investments LLC*, No. 2019-1778, 2021 WL 3120819 (Fed. Cir. July 23, 2021). There, reviewing an IPR final written decision, the Court found that, because “[the patentee] presented evidence that mapped its commercialized SandBox container to the claimed container of the [patent],” a presumption of nexus was appropriate. *Id.*, at *6.

The Court then turned to reviewing the Board’s finding that “[the petitioner] rebutted the presumption of nexus with evidence showing that aspects of a broader SandBox system other than the claimed container product were responsible for the system's success.” *Id.* The Board below credited the fact that the broader system includes numerous unclaimed features, such as “boxes, a conveyor . . . , rig mats, a fork lift, a light-duty loader, and [a] chassis [or] trailers[.]” *Id.* The Board “found persuasive the testimony of [the patentee’s] own witnesses regarding the importance of the non-container aspects to the success of the overall system.” *Id.* And the Board ultimately concluded “[the patentee’s] commercial success and industry praise were ‘largely’ a result of these non-container features ‘rather than the features of the challenged claims,’” thus the presumption of nexus had been rebutted. *Id.*

This Court found the Board’s analysis legally erroneous and remanded the determination. *Id.*, at *7. The Court found the Board failed to “contend with and weigh any of the evidence potentially showing that the SandBox container itself is *also* an important contributor to the commercial success and praise of the system.” *Id.* (emphasis in original). The Court found that, “[a]lthough the evidence the Board did consider showed that other features of [the patentee’s] system are important to the system’s success, and [the patentee] has not disputed that finding, ‘[i]t is not necessary . . . that the patented invention be solely responsible for the commercial success, in order for this factor to be given weight appropriate to the evidence, along

with other pertinent factors.’” *Id.*, at *7 (quoting *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1273 (Fed. Cir. 1991) (alterations in original)).

The evidence Brunswick presents in an effort to defeat Volvo Penta’s presumption of nexus falls far short of the evidence this Court found insufficient in *Oren Technologies*. Substantial evidence does not support the Board’s determination that Volvo Penta is not entitled to a presumption of nexus. Brunswick mustered, and the Board exclusively relied upon, a single statement in a single issue of Volvo Group magazine, published before issuance of the ’692 Patent, that the Forward Drive “includes several patented features that make the drive stand out.” Appx0067 (citing Appx1735). The Board apparently credited the magazine issue’s statement that the features make the product “stand out” as establishing that such features “‘materially impact[]’ the Forward Drive’s functionality,” thus defeating the presumption of co-extensiveness. Appx0067. But Volvo Penta’s “stand out” marketing bravado, proffered by Brunswick, again, falls far short of the rebuttal evidence that the petitioner in *Oren Technologies* raised and which this Court found insufficient. The Board’s analysis was legally erroneous for the same reasons as those provided in *Oren Technologies*.

Brunswick also asserted that Volvo Penta “refused to identify” patents that might cover its Forward Drive, which Brunswick requested apparently in an effort to show that certain features of the Forward Drive might be covered by Volvo Penta

patents other than the '692 Patent. Appx0757 n.4. Brunswick's assertion was wrong. *First*, there was no refusal. In response to Brunswick's Requests for Production of Documents (Appx1699), Volvo Penta responded that no such documents exist. Appx5634. *Second*, Brunswick did not seek any discovery via other means. For example, Brunswick did not seek permission to serve interrogatories on the topic nor did Brunswick seek permission to depose a witness on the topic. In fact, Brunswick did not even question Volvo Penta's employee during his deposition about this subject matter.

Brunswick, for its part, in an effort to rebut Volvo Penta's nexus arguments, could have (and may have) conducted an analysis of Volvo Penta's publicly-available patents to determine which of those patents, if any, might cover other features of the Forward Drive. Indeed, Volvo Penta informed Brunswick that, as would be expected, "[Volvo Penta's] patent and patent application assignment records are publicly available such that [Brunswick] may conduct the requested analysis itself." Appx5634. Brunswick chose not to do so. Instead, Brunswick cited, in a footnote, a single instance of marketing praise, referencing patents, by an article in a magazine for all persons in Volvo Group. The Board's exclusive reliance on that statement in the face of Volvo's strong nexus presumption was unsupported by substantial evidence.

2. Substantial Evidence Does Not Support the Board's Determination That the Evidence of Secondary Considerations of Non-Obviousness Is Not the Direct Result of the Unique Characteristics of the Claimed Invention.

Even if the Board were correct, for the sake of argument, that Volvo Penta is not entitled to a presumption of nexus, Volvo Penta provided sufficient evidence that the evidence of secondary considerations of non-obviousness is the direct result of the unique characteristics of the claim invention. Specifically, Volvo Penta provided evidence that “Brunswick recognized that the success of Volvo Penta’s Forward Drive was tied directly to the claimed features, namely a steerable tractor-type drive as recited in each of the challenged claims.” Appx0068 (citing Appx4521-4523). The Board erred in discrediting this evidence, finding that “[a]lthough that document clearly references the Forward Drive that Patent Owner argues—and Petitioner does not dispute—practices the claims of the ’692 patent, Patent Owner has not adequately identified or explained how the specific ‘capabilities’ of the Forward Drive sought to be matched by Petitioner (whatever they may be) result from or are required by the claims in the ’692 patent.” Appx1292-1293.

The Board’s finding is not supported by substantial evidence. Volvo Penta specifically identified a forward-facing stern drive with an offset steering axis as the unique characteristics of the claimed invention, and it was these characteristics among others which Brunswick recognized were desirable and sought to copy. The Board expressly found that Brunswick “tore down the Forward Drive” and then

“measur[ed] the dimensions of and weigh[ed] several internal components.” Appx1295. The Board ultimately concluded that Brunswick’s process was “akin to ‘copying.’” Appx1297.

The Board’s finding that Volvo Penta had not proven a nexus was unsupported by substantial evidence and should be reversed.

CONCLUSION

For the foregoing reasons, the Board’s determination that the claims of the ’692 Patent were obvious in view of Brandt and Kiekhäfer should be reversed. At the very least, the Board’s decision should be remanded for a reasoned consideration on the record of the totality of the evidence of alleged obviousness in light of Volvo Penta’s compelling evidence of the secondary considerations.

Dated: September 21, 2022

Respectfully submitted,

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Addendum

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Paper 94

Trials@uspto.gov
571-272-7822

Paper 87
Date: March 3, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BRUNSWICK CORPORATION,
Petitioner,

v.

VOLVO PENTA OF THE AMERICAS, LLC,
Patent Owner.

IPR2020-01512
Patent 9,630,692 B2

Before JAMES J. MAYBERRY, ERIC C. JESCHKE, and
FREDERICK C. LANEY, *Administrative Patent Judges*.

JESCHKE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Dismissing Patent Owner's Contingent Motion to Amend
35 U.S.C. § 318(a)

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I. BACKGROUND

Petitioner, Brunswick Corporation, challenges claims 1–18 (the “challenged claims”) of U.S. Patent No. 9,630,692 B2 (Ex. 1001, “the ’692 patent”), which is assigned to Patent Owner, Volvo Penta of the Americas, LLC. We have jurisdiction under 35 U.S.C. § 6, and we issue this Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons below, we conclude that Petitioner has proven, by a preponderance of the evidence, the unpatentability of claims 1–18 of the ’692 patent and we dismiss Patent Owner’s Contingent Motion to Amend.

A. Procedural History

Petitioner filed a Corrected Petition seeking *inter partes* review of the challenged claims. Paper 3 (“Pet.”). Patent Owner filed a Preliminary Response. Paper 10. Upon review of the arguments and supporting evidence, we instituted an *inter partes* review of all claims and grounds asserted in the Petition. Paper 15 (“Decision on Institution” or “Dec. Inst.”).

After institution, Patent Owner filed a Patent Owner Response (Paper 29, “PO Resp.”)¹ and also filed a Contingent Motion to Amend (Paper 31, “MTA”). Petitioner filed a Reply in support of the Petition (Paper 45, “Pet. Reply”)² and also filed an opposition to Patent Owner’s Motion to Amend (Paper 46, “MTA Opp.”). On October 26, 2021, pursuant to Patent Owner’s request (*see* MTA 2), we issued Preliminary Guidance on Patent Owner’s Motion to Amend. Paper 59 (“PG”). Patent Owner then filed a Sur-reply to

¹ Paper 30 is a public version of the Patent Owner’s Response.

² Paper 44 is a public version of the Petitioner’s Reply.

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Petitioner’s Reply (Paper 65, “PO Sur-reply”)³ and also filed a Reply in support of its Contingent Motion to Amend (Paper 66 (“MTA Reply”)). Petitioner then filed a Sur-reply in opposition to Patent Owner’s Motion to Amend. Paper 73 (“MTA Sur-reply”).

Petitioner relies on the declaration testimony of Mr. Robert A. Schofield filed with the Petition (Ex. 1002 (“the Schofield Petition Declaration” or “Schofield Pet. Decl.”)) in this proceeding⁴ and in IPR2020-01560 (Ex. 1035).

Patent Owner relies on the declaration testimony of Dr. Eric Winkel filed with the Patent Owner’s Response and the Motion to Amend (Ex. 2027, “3d Winkel Decl.”)⁵ and Dr. Winkel’s declaration testimony filed with the Reply in support of the Contingent Motion to Amend (Ex. 2059). An oral argument in this proceeding was held on December 10, 2021, and a copy of the transcript was entered into the record. Paper 81 (“Tr.”).

B. Related Proceedings

The parties identify litigation in the U.S. District Court for the District of Delaware involving the ’692 patent: *Volvo Penta of the Americas, LLC v. Brunswick Corp.*, No. 1-20-cv-01678-LPS (D. Del.), filed December 10, 2020 (the “Delaware Litigation”). Paper 8 (Patent Owner’s Updated Mandatory Notices) § II.D; Paper 11 (Petitioner’s Updated Mandatory Notices) § B. The Delaware Litigation is stayed.

³ Paper 65 is a public version of the Patent Owner’s Sur-reply.

⁴ Petitioner filed a corrected version of the Schofield Petition Declaration on September 2, 2020. We refer to that version in this Decision.

⁵ Ex. 2027 is also a public version of Dr. Winkel’s Third Declaration.

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On September 15, 2020, Petitioner filed an additional petition for *inter partes* review of claims 1–18 of the '692 patent in IPR2020-01560. *See Brunswick Corp. v. AB Volvo Penta*, IPR2020-01560, Paper 3 (PTAB Sept. 15, 2020). We denied institution in IPR2020-01560.

C. The '692 Patent

The '692 patent “relates to tractor-type drives, those having forward facing propellers configured to pull a boat through the water.” Ex. 1001, 1:7–9. According to the '692 patent, “significant steering loads can be caused by the high transverse loading from forward facing propellers” in prior art systems. *Id.* at 2:62–64. Figure 3 is reproduced below:

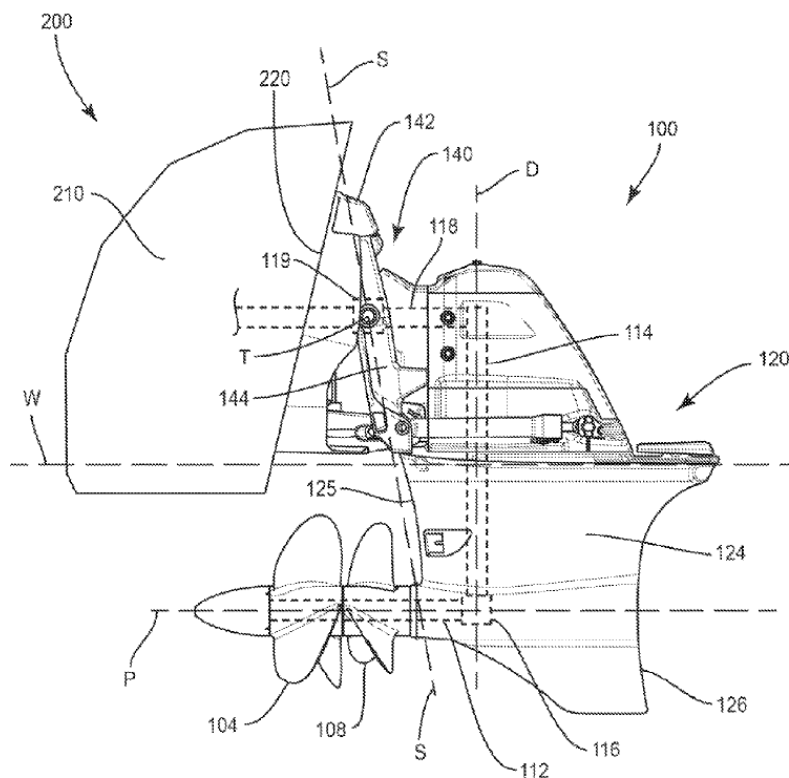
**FIG. 3**

Figure 3 depicts a tractor-type drive for a boat. Ex. 1001, 2:34–34, 3:10–11. The '692 patent discloses that depicted drive 100 “is configured to

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have improved steering by reducing the net torque around its steering axis.” *Id.* at 3:26–27. As shown in Figure 3, drive 100 includes drive housing 120 and propellers 104, 108, driven by a pair of counter-rotating propeller shafts 112. *See id.* at 3:27–38. Drive torque from an engine in boat 200 rotates input shaft 118, which in turn rotates vertical drive shaft 114 and propeller shaft 112. *See id.* at 3:40–51. Drive 100 also includes drive support 140 for mounting drive housing 120 to stern 210 of boat 200. *See id.* at 3:52–54. In use, drive housing 120 is selectively pivoted about steering axis S to direct the propulsive force from the propellers and thereby steer the boat. *See id.* at 3:54–57, 3:65–4:9. According to the ’692 patent, “unlike prior steerable tractor-type drives, the drive 100 of this disclosure has its steering axis S offset from the vertical drive shaft axis D.”⁶ *Id.* at 4:9–11.

Figure 4 is reproduced below:

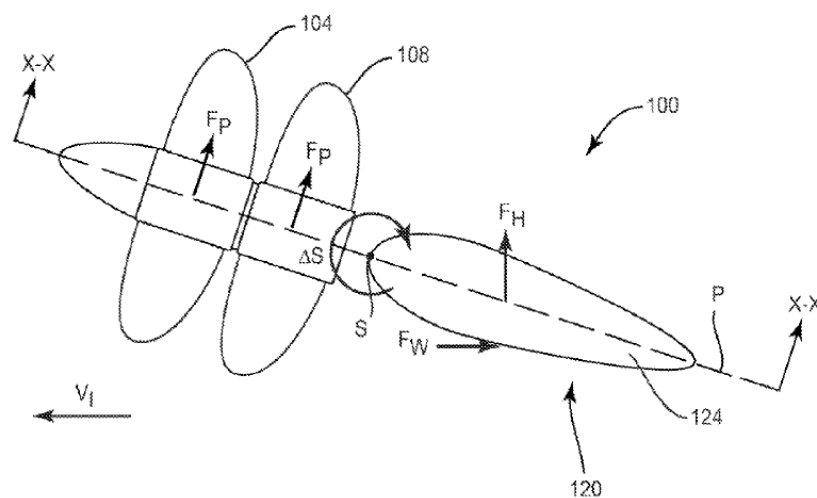


FIG. 4

⁶ Throughout this Decision, we omit any bold emphasis of reference numerals in quotations from the ’692 patent and from prior art references.

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Figure 4 depicts a schematic force diagram of embodiments of the invention. Ex. 1001, 2:36–37. The '692 patent discloses that “displacing the steering axis S in a forward direction relative to the drive shaft axis D provides a dual set of advantages resulting in steering force reduction.” *Id.* at 4:34–36. “First, moving the steering axis S forward, closer to the planes of rotation of the forward and rearward propellers 104, 108 reduces the steering torque about the steering axis S by decreasing the moment arm of each propeller force” F_P shown in Figure 4. *Id.* at 4:37–41. And second, “shifting the steering axis S alters the relative position of the center of pressure applied to the underwater portion 124 of the drive housing 120 by water flowing on the drive housing 120 during a steering maneuver.” *Id.* at 4:41–45.

More specifically, during a left turn as depicted in Figure 4, with the propeller axis P oblique to the oncoming water, the portion of each blade on the lower side of the X-X axis (as depicted) will provide more lift than the portion of each blade on the other side of the X-X axis, thereby causing large net propeller steering forces F_P . *See* Ex. 1001, 5:1–15. At the same time, however, water rushing past drive 100 during the turn provides a force F_W , which results in a housing force F_H that opposes steering forces F_P . *See id.* at 5:16–24. In this way, according to the '692 patent, the “net steering forces on the drive 100 as felt by the operator are reduced as compared to other drives of the steerable tractor-type.” *Id.* at 5:24–27.

D. Challenged Claims

Petitioner challenges claims 1–18, of which claims 1, 8, 11, 17, and 18 are independent. Claims 2–7 depend from claim 1, claims 9 and 10

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depend from claim 8, and claims 12–16 depend from claim 11. Independent claim 1 is reproduced below, with bracketed numbers and letters added:

1. [1

[b]] A steerable tractor-type drive for a boat, comprising:

[1

[a]] a drive support mountable to a stern of the boat;

[1

[b]] a drive housing pivotally attached to the support about a steering axis, [1

[c]] the drive housing having a vertical drive shaft connected to drive a propeller shaft, the propeller shaft extending from a forward end of the drive housing;

[1

[d]] at least one pulling propeller mounted to the propeller shaft,

[1

[e]] wherein the steering axis is offset forward of the vertical drive shaft.

Ex. 1001, 5:48–58.⁷

E. Instituted Grounds of Unpatentability

We instituted *inter partes* review of the challenged claims based on the following grounds of unpatentability asserted by Petitioner:

Claim(s) Challenged	35 U.S.C. § ⁸	Reference(s)/Basis
1–3, 11–13, 15, 17, 18	102(a)	Kiekhaefer ⁹

⁷ We adopt Petitioner’s designations for the elements of the challenged claims. See Pet. 97–99 (showing numerical designations for the language in the challenged claims). We apply these designations below.

⁸ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Pub. L. No. 112-29, §§ 3(b)–3(c), 3(n)(1), 125 Stat. 284, 285–87, 293 (2011). Because the application from which the ’692 patent issued was filed after March 16, 2013, we apply the AIA versions of these statutes.

⁹ US 2,616,387, issued November 4, 1952 (Ex. 1004, “Kiekhaefer”).

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Claim(s) Challenged	35 U.S.C. §⁸	Reference(s)/Basis
4, 7	103	Kiekhäfer, Stechauner ¹⁰
1–18	103	Brandt ¹¹ , Kiekhäfer
4, 7	103	Brandt, Kiekhäfer, Stechauner

II. DISCUSSION*A. The Level of Ordinary Skill in the Art*

The level of ordinary skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *Id.* (internal quotation marks and citation omitted).

Petitioner contends, with accompanying declaration testimony, that a person having ordinary skill in the art at the time of the alleged invention would have (1) had “at least a bachelor’s degree in naval architecture, marine engineering, or other similar discipline with course work in hydrodynamics and the design of propulsion systems for boats,” (2) had “at

¹⁰ US 1,813,552, issued July 7, 1931 (Ex. 1006, “Stechauner”).

¹¹ US 4,840,136, issued June 20, 1989 (Ex. 1005, “Brandt”).

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least two years of experience designing boats, propulsion systems for boats, or both,” and (3)

been familiar with the principles that the '692 patent admits as being part of the general knowledge of the art, including (i) stern drives (Ex.1001, 1:19-52), (ii) dual counter-rotating pulling/tractor-type propellers for boats (*id.*; Ex.1006, 2:61-66), and (iii) that if an underwater drive housing is mostly rearward of a steering axis, then the center-of-pressure of the water flow upon the drive housing will *necessarily* be rearward of the steering axis (Ex.1001, 4:51-55; Ex.1005, 2:18-20).

Pet. 7–8. Prior to institution, Patent Owner did not address or dispute Petitioner’s proposed definition of the level of ordinary skill in the art. In the Decision on Institution, we adopted Petitioner’s proposed level of ordinary skill in the art, stating that it “appear[ed] consistent with the record at th[at] stage of the proceeding, including the prior art.” Dec. Inst. 22. The parties did not address this issue during trial. We maintain the definition of the level of ordinary skill in the art adopted as of institution.

B. Claim Construction

1. The Applicable Standard

In *inter partes* reviews, the Board interprets claim language using the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). See 37 C.F.R. § 42.100(b). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. See *Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms

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under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

2. Summary of the Parties' Positions

Petitioner proposes a construction for the term “a center of pressure applied by water moving past the drive housing during a turn” in claims 8, 11, 17, and 18. *See* Pet. 8–9. Patent Owner addresses that claim phrase, and argues that independent claims 1, 8, and 18 are limited to “specific improvements to a stern drive” and that the remaining independent claims—11 and 17—are limited to specific improvements to a “boat having a stern drive.” PO Resp. 12; *see id.* at 12–29 (claim construction arguments).

We address Patent Owner’s argument regarding stern drives below. We do not discern a need to construe explicitly the “center of pressure” limitation highlighted by Petitioner, or any other claim terms, because doing so would have no effect on the analysis below. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (stating that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

3. The Claims Are Limited to “Stern Drives”

Patent Owner argues that independent claims 1, 8, and 18 are limited to “specific improvements to a stern drive” and that independent claims 11 and 17 are limited to specific improvements to a “boat having a stern drive.” PO Resp. 12; *see id.* at 12–19 (addressing this claim construction issue). Patent Owner explains that a “stern drive is a type of propulsion system in which the engine is located inside the hull of the boat, and the drive is located outside the hull and attached to and behind the stern of the boat” and

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states that a stern drive “is in contrast to inboard drives and boats with outboard motors.” *Id.* at 12 (citing 3d Winkel Decl. ¶¶ 36, 37, 41, 42, 55, 56); *see also* Ex. 1001, 1:13–21 (discussing inboards, outboards, and stern drives as three types of marine propulsion systems). According to Patent Owner, limiting claims 1, 8, 11, 17, and 18 to improvements involving stern drives is consistent with the claim language, the understanding of one of ordinary skill in the art, and the specification of the ’692 patent. *See* PO Resp. 12–19; PO Sur-reply 1–6. Petitioner counters that the claims are *not* limited to stern drives. *See* Pet. Reply 2–5. For the reasons below, we determine that the record supports Patent Owner’s position.

We start with the claim language at issue. *TQ Delta, LLC v. DISH Network LLC*, 929 F.3d 1350, 1357 (Fed. Cir. 2019). Claim 1 recites “a drive support mountable to a stern of the boat.” Ex. 1001, 5:49. Remaining independent claims 8, 11, 17, and 18 recite similar requirements. *See id.* at 6:19–20 (claim 8, reciting “a drive housing support for mounting the drive housing to the boat”), 6:47–48 (claim 11, reciting “a drive housing support steerably mounting the drive housing to the stern of the boat”), 7:17–18 (claim 17, reciting the same), 8:10–11 (claim 18, reciting “a drive housing support for mounting the drive housing to the boat”).¹²

In addition, claim 1 recites “a drive housing pivotally attached to the support about a steering axis.” Ex. 1001, 5:49. Claims 8, 11, 17, and 18 recite similar requirements for a “drive housing.” *See id.* at 6:17–18 (claim 8, reciting “a drive housing with at least one front-facing propeller for pulling the boat through the water”), 6:45–46 (claim 11, reciting “a drive

¹² We refer to these, collectively, as the “drive support” limitations.

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housing having at least one pulling-type propeller forwardly mounted thereon”), 7:12–13 (claim 17, reciting the same), 8:8–9 (claim 18, reciting “a drive housing with at least one front-facing propeller for pulling the boat through the water”).¹³ Further, although we need not determine whether they are limiting, the preambles of independent claims 1, 8, and 18 recite a “drive.” *See id.* at 5:48, 6:16, 8:7.

Patent Owner argues that one of ordinary skill in the art would have understood the “drive support” limitations and “drive housing” limitations, as well as term “drive” as used in these limitations, as limiting the claims to improvements involving stern drives, and as not relating to inboard or outboard propulsion systems. *See* PO Resp. 13–15 (citing 3d Winkel Decl. ¶¶ 41, 42, 44, 45, 48). The record supports Patent Owner’s position as to the claim language itself. For the reasons presented by Patent Owner, and supported by the testimony of Dr. Winkel, we are persuaded that one of ordinary skill in the art would have understood the scope of the independent claims as proposed by Patent Owner. *See* PO Resp. 13–15 (citing 3d Winkel Decl. ¶¶ 41, 42, 44, 45, 48). As noted by Patent Owner, Petitioner does not address how the “drive support” limitations and “drive housing” limitations would have been understood in the claim construction discussion. *See, e.g.,* Pet. Reply 2–5; PO Sur-reply 2 (“Petitioner *never* addresses the plain and ordinary meaning of the claim terms in its Petition or its Reply, instead beginning with the background section of the ’692 Patent.”).

For example, Petitioner does not provide declarant testimony as to how the “drive support” limitations, the “drive housing” limitations, or the

¹³ We refer to these, collectively, as the “drive housing” limitations.

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term “drive” generally would have been understood, and does not address Dr. Winkel’s relevant declaration testimony. *See* Pet. Reply 2–5. The un rebutted testimony of Dr. Winkel regarding the meaning of the claim language at issue supports Patent Owner’s proposed construction. *See, e.g.*, 3d Winkel Decl. ¶¶ 44 (stating that one of ordinary skill in the art would have understood “that th[e ‘drive support’] limitation limits the claim to a drive that is a stern drive”), 45 (stating that one of ordinary skill in the art would have understood the “drive housing” limitations, alone or in combination with the “drive support” limitations, as “limit[ing] the claim[s] to a drive that is a stern drive”); *see also* PO Sur-reply 4 (noting that “Dr. Winkel’s testimony (Ex. 2027, ¶¶ 36–50) concerning claim construction is un rebutted”).

As to the “drive support” limitations, Petitioner highlights a statement in Dr. Winkel’s deposition, arguing that Dr. Winkel improperly imported “unclaimed structures—a transom shield and gimbal ring—solely because those structures are examples in the specification.” Pet. Reply 3 (citing Ex. 1024, 109:18–24). Considering his testimony as a whole, we do not view Dr. Winkel to have improperly imported these structures to limit the claims to stern drives via the “drive support” limitations. *See* Ex. 1024, 87:1–12 (“[W]e have to look at the claim as a whole, and there’s these components that inform a person of ordinary skill that it is, in fact, a stern drive. The drive support mountable to the stern of a boat, the drive housing”), *cited at* PO Sur-reply 2 n.2.

As asserted by Patent Owner, this statement shows that Dr. Winkel views the disclosed transom shield and gimbal ring (structures unique to

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stern drives) as *further support* that the “drive support” limitations limit the claims to stern drives. *See* PO Sur-reply 2 n.2. In his declaration, Dr. Winkel adequately explains why the “drive support” limitations indicate that the claims are for improvements to stern drives, even without requiring a transom shield and gimbal ring. *See* 3d Winkel Decl. ¶ 44 (“For example, claim 1 recites ‘a drive support mountable to a stern of the boat.’ This limitation further signals to [one of ordinary skill in the art] that the drive is mountable on the stern, *i.e.*, back of the boat, and the drive support serves as a support structure for the drive housing. [One of ordinary skill in the art] would understand that this limitation limits the claim to a drive that is a stern drive.”).

Turning back to the discussion of the claim language generally, Petitioner presents a claim differentiation argument relating to claim 16, which recites: “The boat of claim 11, further comprising an engine housed within the hull of the boat, and a transmission input shaft extending through a transom of the boat into the gear case to provide a stern drive.” Ex. 1001, 7:7–10. Under the doctrine of claim differentiation, “the presence of a dependent claim that adds a particular limitation raises a presumption that the limitation in question is not found in the independent claim.” *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004).

Petitioner asserts that accepting Patent Owner’s construction limiting the claims to improvements involving stern drives renders superfluous “to provide a stern drive” in claim 16. *See* Pet. Reply 4–5. Petitioner asserts that “[c]laim 16 expressly states that ‘a stern drive’ is only provided once an engine is added” and that Patent Owner’s “attempt to construe a ‘drive’ as a

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‘stern drive,’ when none of those other claims requires an engine, is inconsistent with the plain language of claim 16, which adds the engine.” Pet. Reply 4–5. Patent Owner responds that its construction does not render that language superfluous because claim 16 recites additional components (such as an “engine”) not recited in claim 11, which “focus[es] on the drive components of the stern drive.” See PO Resp. 17–18; PO Sur-reply 5–6.

We are not persuaded by Petitioner’s implicit position that claim 11 includes, for example, outboard drives *and* stern drives, and that claim 16 limits that scope to stern drives based on the added recitations of an “engine” and “transmission input shaft.” Instead, we find more persuasive Patent Owner’s position, supported by the testimony of Dr. Winkel, that claim 11 provides the “drive components of the stern drive” and that claim 16 adds the “engine” and “transmission input shaft” to provide a more complete “stern drive” propulsion system. See PO Resp. 17 (citing 3d Winkel Decl. ¶ 46). First, for the reasons discussed above, the “drive support” and “drive housing” limitations in claim 11 limit that claim to improvements involving stern drives. Second, Patent Owner’s understanding aligns with the description of stern drive propulsion systems as including “an engine mounted in the hull” (as generally recited in claim 16) “connected to a drive unit mounted outside of the hull, typically on the stern” (as generally recited in claim 11). See Ex. 1001, 1:19–21.

We turn now to the Specification. Patent Owner takes the position that the written description and figures indicate that the claims are limited to improvements to stern drives and do not cover, for example, outboard propulsion systems. See PO Resp. 15–17; PO Sur-reply 3–4. Petitioner

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responds that Patent Owner’s position improperly imports limitations from the Specification. *See* Pet. Reply 2–4. Although some aspects of the Specification support Petitioner, the record overall supports Patent Owner.

We first address the term “drive” alone. As highlighted by Petitioner, the background section of the ’692 patent states that “[m]arine *drives* may be generally classified as inboard, outboard, or inboard/outboard.” Ex. 1001, 1:13–14 (emphasis added), *quoted at* Pet. 11 n.3. This could be seen as supporting the view that the term “drive” in the claims—as a modifier in the “drive housing” and “drive support” limitations and in some preambles—does not *by itself* limit the claims to improvements to stern drives. *Cf.* Pet. Reply 4 (“PO could have recited ‘stern drive’ in the independent claims, but chose a broader, generic term—‘drive’—that encompasses more.”). As noted by Patent Owner, however, *directly after that statement*, the Specification describes structural differences between the three types of disclosed propulsion systems (i.e., “drives”), based primarily on the locations of the engine and “drive” or “drive unit” for each. *See* PO Resp. 15–16 (discussing Ex. 1001, 1:13–21). In other words, the ’692 patent describes the *entire propulsion system* as a “drive,” but also describes *a portion of the system* as a “drive” or “drive unit”—namely, the portion not including the “engine.” *See* Ex. 1001, 1:13–21. For example, the Specification describes “an outboard *drive*” as including a “propeller *drive*” and an “engine” and describes a “stern *drive*[]” as including a “*drive unit* mounted outside of the hull” that is connected to an engine mounted in the hull. *Id.* at 1:17–21 (emphasis added). Although the Specification uses “drive” to refer to the entire propulsion system *and also* to refer a portion of

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each propulsion system (not including the engine), the record supports Patent Owner’s view that “drive” as used in the independent claims refers to the “drive portion of the boat’s propulsion system.” PO Resp. 14 (citing 3d Winkel Decl. ¶¶ 41, 42, 48). For example, although each of the *propulsion systems* includes an engine (Ex. 1001, 1:13–21), the “drive” recited in the preambles to independent claims 1, 8, and 18 does not.¹⁴

Even with this understanding of “drive,” however, the record does not support Petitioner’s view that the independent claims (including those reciting a “drive” in the preamble”) encompass the “drive” portion of *any* of the three disclosed propulsion systems—outboards, inboards, and stern drives. *Cf.* Pet. Reply 4 (arguing that “construing the claimed ‘drive’ to only cover one type of drive—a ‘stern drive’—contradicts the intrinsic record’s consistent use of ‘drive’ as a broad term covering multiple drive types”). For example, as discussed above, we are persuaded that the “drive support” limitations and the “drive housing” limitations recited in each of the independent claims—alone and in combination—would be understood as limiting the claims to improvements involving stern drives, as opposed to, for example, improvements involving outboard propulsion systems.

This understanding of the claim scope is further supported by the Specification. For example, the abstract refers to a “tractor-type *stern drive* for a boat.” Ex. 1001, code (57) (emphasis added), *quoted at* PO Resp. 16. Further, as noted by Patent Owner, the description of the drive portion of a stern drive from the background aligns with the description and depiction of

¹⁴ As discussed above, claim 16’s recitation of “stern drive” uses “drive” to refer to the propulsion system overall.

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the embodiment in Figure 3. *See* PO Resp. 16–17 (discussing Ex. 1001, 3:27–28, 3:46–49, 3:52–60, 3:64–65). And the description of the stern drive in Figure 3 uses the same language as the “drive housing” and “drive support” limitations in the independent claims, with the Specification describing “drive housing” 120 and “drive support” 140. *See, e.g.*, Ex. 1001, 3:26–65. Although Petitioner is generally correct that we should not limit the claims to improvements involving stern drives based *solely* on the fact that the only example in the Specification is a stern drive (Pet. Reply 3–4 (*citing Liebel-Flarsheim*, 358 F.3d at 898)), as discussed above, the record supports that the “drive support” and the “drive housing” limitations—alone and together—would be understood as limiting the independent claims to improvements involving stern drives, as opposed to, for example, improvements involving outboard propulsion systems.

This understanding of the claim scope is further supported by the fact that the Specification describes an entire outboard propulsion system—i.e., a “propeller drive and engine”—as “configured as a unit attached to and located outside the hull” (Ex. 1001, 1:19), whereas the claims require a “drive housing”—i.e., a “housing” for the *drive portion* of the propulsion system (based on the understanding of “drive” discussed above)—as well as a “support” mounting that “housing” to the “stern.” *See* PO Resp. 15 (arguing that one of ordinary skill in the art “would recognize that such references to a ‘drive support’ and a ‘drive housing’ individually indicate that the drive and engine are not configured in such a unit” in an outboard propulsion system (citing 3d Winkel Decl. ¶¶ 44–45)).

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We do not view the generic boilerplate language in the '692 patent (common to many specifications) as somehow expanding the scope of the invention disclosed to include outboard propulsion systems, as argued by Petitioner. *See* Pet. Reply 4 (citing Ex. 1001, 2:19–22, 2:44–46); *see, e.g., D Three Enters., LLC v. SunModo Corp.*, 890 F.3d 1042, 1051 (Fed. Cir. 2018) (“[B]oilerplate language at the end of the . . . specification is not sufficient to show adequate disclosure of the actual combinations and attachments used in the . . . [c]laims.”). For these reasons, the intrinsic evidence strongly supports Patent Owner’s view that the claims are limited to improvements involving stern drives, and do not encompass, for example, improvements involving outboard propulsion systems.

We turn now to the extrinsic evidence. Patent Owner cites to Dr. Winkel’s discussion of Exhibits 2015–2017: printouts of websites of one of Petitioner’s business units, which allegedly show how one of ordinary skill in the art would understand the term “drive.” *See* PO Resp. 15 (citing 3d Winkel Decl. ¶¶ 48–49; Exs. 2015 & 2016). According to Patent Owner, Exhibits 2015 and 2016 each “shows a drive unit separate from an engine for use in a stern drive (or inboard / outboard) propulsion system” whereas, “when Petitioner refers to outboard motors,” as in Exhibit 2017, “the outboard motor includes an integrated monolithic unit, and when showing and/or describing outboard motors, Petitioner omits any use of the term ‘drive.’” 3d Winkel Decl. ¶ 48, *cited at* PO Resp. 15.

In a claim construction analysis, “[i]f the meaning of a claim term is clear from the intrinsic evidence, there is no reason to resort to extrinsic evidence.” *Seabed Geosolutions (US) Inc. v. Magseis FF LLC*, 8 F.4th

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1285, 1287 (Fed. Cir. 2021) (citing *Profectus Tech. LLC v. Huawei Techs. Co.*, 823 F.3d 1375, 1380 (Fed. Cir. 2016) (“Extrinsic evidence may not be used ‘to contradict claim meaning that is unambiguous in light of the intrinsic evidence.’” (quoting *Phillips*, 415 F.3d at 1324))). We determine that this claim construction issue is clear from the intrinsic evidence, and we do not resort to the extrinsic evidence highlighted by Patent Owner.

For the reasons discussed above, the record supports Patent Owner’s view that the independent claims are limited to improvements involving stern drives, and do not encompass, for example, improvements involving outboard propulsion systems.

C. Asserted Anticipation of Claims 1–3, 11–13, 15, 17, and 18 by Kiekhaefer

Petitioner asserts that claims 1–3, 11–13, 15, 17, and 18 of the ’692 patent are anticipated under 35 U.S.C. § 102(a) by Kiekhaefer. Pet. 3, 9–39; Pet. Reply 27–28. Patent Owner provides arguments specifically addressing this asserted ground. PO Resp. 20–30. We first summarize aspects of Kiekhaefer.

1. Kiekhaefer

Kiekhaefer discloses an outboard motor with a lower propeller unit than can be assembled with the propeller facing either rearward “as in conventional motors” (as in Figure 1, below) or forward as “a tractor-type propeller” (as in Figure 2, below). Ex. 1004, 1:1–13.

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Figures 1 and 2 of Kiekhaefer are reproduced below:

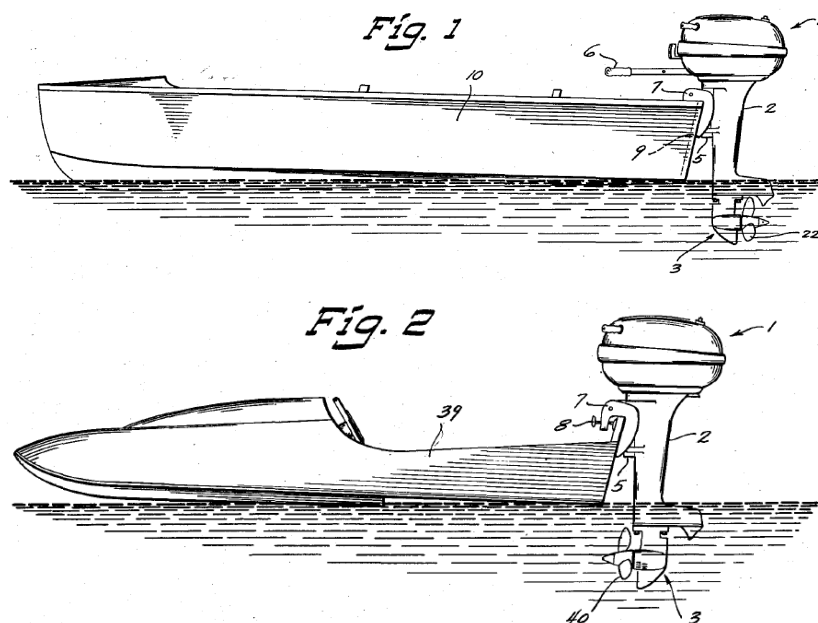


Figure 1 depicts “an outboard motor secured to a utility boat and mounting a pusher-type propeller for general service” whereas Figure 2 depicts “the motor secured to a hydroplane for racing and mounting a tractor-type propeller.” Ex. 1004, 1:26–31. The “outboard motor” shown in both Figures includes engine 1, “housing 2 supporting engine 1 at its upper end,” “lower underwater propeller unit 3 carried by housing 2 at its lower end,” and “drive shaft 4 extending vertically within housing 2 to connect engine 1 and the propeller unit 3.” *Id.* at 1:39–45; *see also id.*, Figs. 3 & 4 (showing drive shaft 4). In addition, swivel bracket 5—secured to the boat structure via clamp bracket 7 and clamp screws 8—supports housing 2 of the motor to allow steering of boat 10 (Fig. 1) or 39 (Fig. 2). *See id.* at 1:46–56.

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Figure 4 is reproduced below:

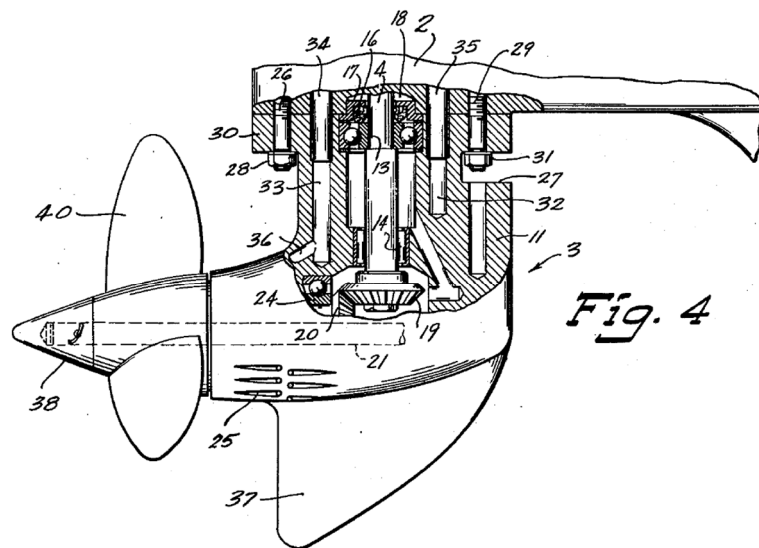


Figure 4 is an enlarged side view of the lower end of the motor shown in Figure 2, sectioned and with certain parts broken away. *See* Ex. 1004, 1:35–36, 1:29–31. As shown, gear 19, carried at the lower end of drive shaft 4, engages gear 20, carried by propeller shaft 21. *See id.* at 2:23–27.

2. Analysis

a. Independent Claims 1, 11, 17, and 18

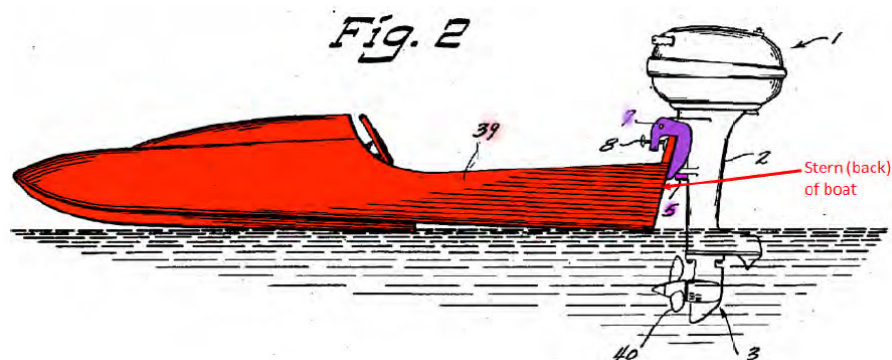
For independent claims 1, 11, 17, and 18, Petitioner contends that Kiekhaefer discloses each limitation. Pet. 9–21, 24–30, 33–39. Patent Owner argues that all the independent claims are limited to improvements involving a “stern drive” and that Kiekhaefer relates to only outboard motors, not stern drives. *See* PO Resp. 20–27.

As to the “drive support” limitations in each of claims 1, 11, 17, and 18, Petitioner identifies swivel bracket 5 and clamp bracket 7 in Kiekhaefer, shown in purple in the annotated version of Figure 2 below:

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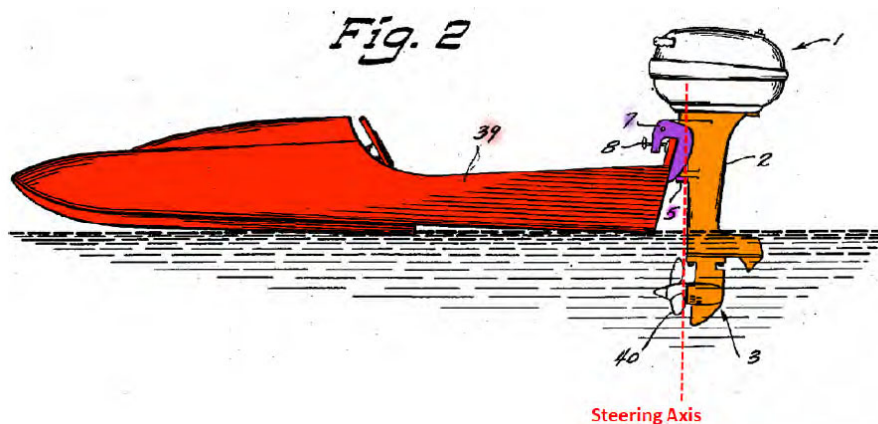
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Pet. 12 (claim 1), 25 (claim 11), 34 (claim 17), 38 (claim 18). Figure 2 depicts “the motor secured to a hydroplane for racing and mounting a tractor-type propeller.” Ex. 1004, 1:26–31. In the annotated version of Figure 2 here, Petitioner added (1) red shading to boat 39 and (2) purple shading to swivel bracket 5 and clamp bracket 7. Pet. 12.

As to the “drive housing” limitations in each of claims 1, 11, 17, and 18, Petitioner identifies the structure shown in orange in the annotated version of Figure 2 below:



Pet. 13 (claim 1), 24 (claim 11), 34 (claim 17), 38 (claim 18). Figure 2 depicts “the motor secured to a hydroplane for racing and mounting a tractor-type propeller.” Ex. 1004, 1:26–31. In the annotated version of Figure 2 here, Petitioner added (1) red shading to boat 39, (2) purple shading

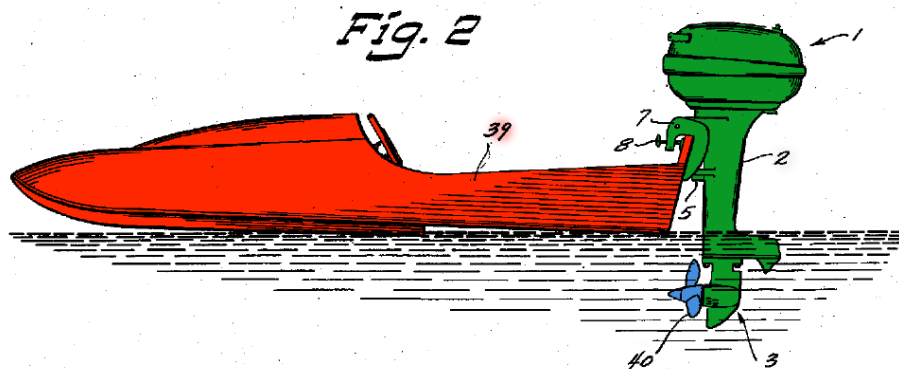
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to swivel bracket 5 and clamp bracket 7, and (3) orange shading to certain structures of the outboard motor. Pet. 13.

As the “drive” recited in the preambles of claims 1 and 18, Petitioner identifies the *entire* outboard propulsion system in Kiekhaefer, as shown in green and blue below:



Pet. 10; *see also* Pet. 11 (stating that “Kiekhaefer thus discloses a drive (i.e., drive 1, green and blue above)”). Figure 2 depicts “the motor secured to a hydroplane for racing and mounting a tractor-type propeller.” Ex. 1004, 1:26–31. In the annotated version of Figure 2 here, Petitioner added (1) red shading to boat 39, (2) green shading to the outboard motor, and (3) blue shading to propeller 40. Pet. 10.

Patent Owner argues that Kiekhaefer does not anticipate independent claims 1, 11, 17, and 18 because it discloses an outboard propulsion system only whereas the claims are limited to improvements involving stern drives, and do not encompass, for example, improvements involving outboard propulsion systems. *See* PO Resp. 20–27. Petitioner repeats many of the claim construction arguments discussed above, such as that “a ‘drive housing’ is not a ‘stern drive housing.’” Pet. Reply 27–28.

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Because the independent claims are limited to improvements involving stern drives, and do not encompass, for example, improvements involving outboard propulsion systems, and because Kiekhaefer only discloses improvements involving outboard propulsion systems, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 1, 11, 17, and 18 are anticipated by Kiekhaefer.

b. Dependent Claims 2, 3, 12, 13, and 15

Claims 2 and 3 depend from independent claim 1, and claims 12, 13, and 15 depend from independent claim 11. For the reasons discussed above as to claims 1, 11, 17, and 18 in the context of this asserted ground, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 2, 3, 12, 13, and 15 are anticipated by Kiekhaefer.

D. Asserted Obviousness of Claims 4 and 7 Based on Kiekhaefer and Stechauner

Petitioner asserts that claims 4 and 7 of the '692 patent are unpatentable under 35 U.S.C. § 103 based on Kiekhaefer and Stechauner. Pet. 3, 39–46; Pet. Reply 27–28. Patent Owner provides arguments specifically addressing this asserted ground. PO Resp. 30–31. We first summarize aspects of Stechauner.

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1. Stechauner

In this asserted ground, Petitioner relies on Stechauner, in addition to Kiekhaefer (summarized above (*see* § II.C.1)). Stechauner discloses “propelling mechanism[s] for water craft.” Ex. 1006, p. 2, ll. 1–2.¹⁵

Figures 1 and 2 of Stechauner are reproduced below:

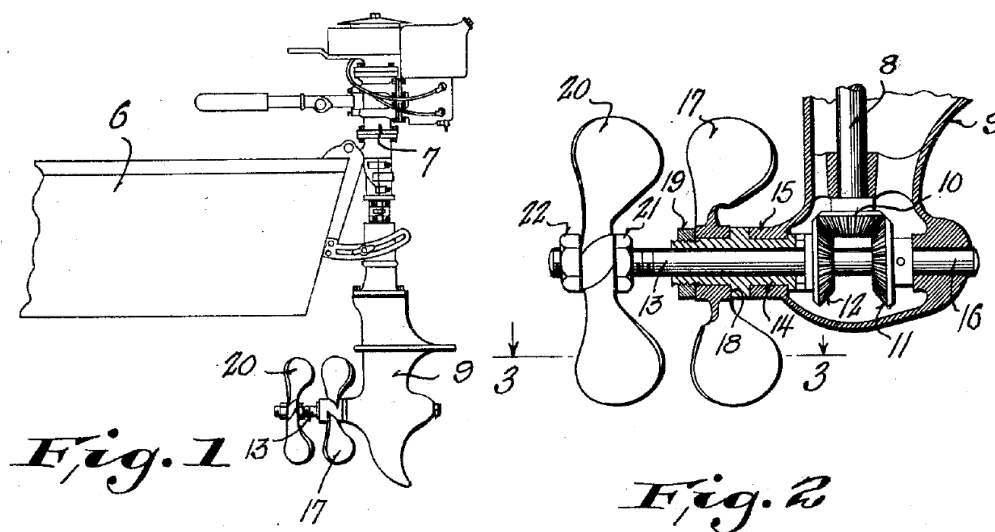


Figure 1 depicts “an outboard motor equipped with [a] propelling mechanism embodying the invention.” Ex. 1006, p. 2, ll. 19–22. Figure 2 depicts a detailed sectional view of the propelling mechanism in Figure 1. *Id.*, p. 2, ll. 23–24. As shown in detail in Figure 2, transmission shaft 8 transmits power down to bevel gear 10, and then to “oppositely disposed bevel gears 11 and 12, respectively fixed to propeller shafts 13 and 14.” *Id.*, p. 2, ll. 34–37. Shafts 13 and 14 are attached to propellers 20 and 17, respectively, which, when in motion, “are driven in opposite directions and

¹⁵ For citations to Stechauner, we refer to the page numbering added by Petitioner, rather than the original page numbering of the patent.

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at the same speed.” *Id.*, p. 2, ll. 42–53. Stechauner identifies efficiency benefits to using two propellers in the disclosed manner. *Id.*, p. 2, ll. 61–92.

2. Analysis

For dependent claims 4 and 7, Petitioner contends that the proposed combination of Kiekhaefer and Stechauner discloses each of the limitations. Pet. 39–46; Pet. Reply 28. Patent Owner argues that “because neither reference nor the combination of references discloses a stern drive, the Petition cannot show that claims 4 and 7 are obvious.” PO Resp. 30.

Claims 4 and 7 both depend from independent claim 1. In the context of this asserted ground, Petitioner continues to rely on Kiekhaefer for all the limitations in independent claim 1. *See* Pet. 39. For the reasons argued by Patent Owner, and as discussed above as to claim 1 in the context of the asserted ground based on Kiekhaefer alone, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 4 and 7 would have been obvious based on Kiekhaefer and Stechauner.

E. Asserted Obviousness of Claims 1–18 Based on Brandt and Kiekhaefer

Petitioner asserts that claims 1–18 of the ’692 patent are unpatentable under 35 U.S.C. § 103 based on Brandt and Kiekhaefer. Pet. 3, 46–92; Pet. Reply 5–27. Patent Owner provides arguments specifically addressing this asserted ground. PO Resp. 31–63; PO Sur-reply 6–25. We begin our analysis with an overview of the asserted prior art and then address the parties’ specific contentions in turn.

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1. Brandt

In this asserted ground, Petitioner relies on Brandt, in addition to Kiekhaefer (summarized above (*see* § II.C.1)). Brandt discloses “a propeller drive for boats, comprising a pair of concentric counter-rotationally driven propeller shafts in a drive housing.” Ex. 1005, 1:8–13. Figure 1 of Brandt is reproduced below:

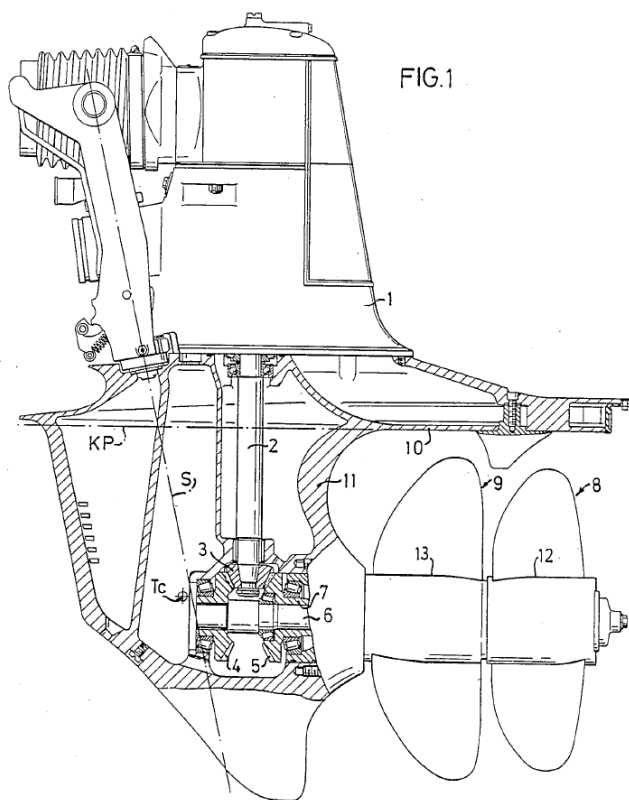


Figure 1 is a side view “in partial section of a double propeller drive unit.” Ex. 1005, 2:55–56. The depicted drive unit includes housing 1, propeller shaft 6 carrying propeller 8, and propeller shaft 7 carrying propeller 9. *See id.* at 2:59–63, 2:68–3:1. Brandt discloses gears 3, 4, 5 that allow output shaft 2 to drive propeller shafts 6, 7 (and thus, propellers 8, 9) in opposite directions. *See id.* at 2:62–3:5. Housing 1 pivots about steering axis S. *See id.* at 3:6–8.

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Figure 2 is reproduced below:

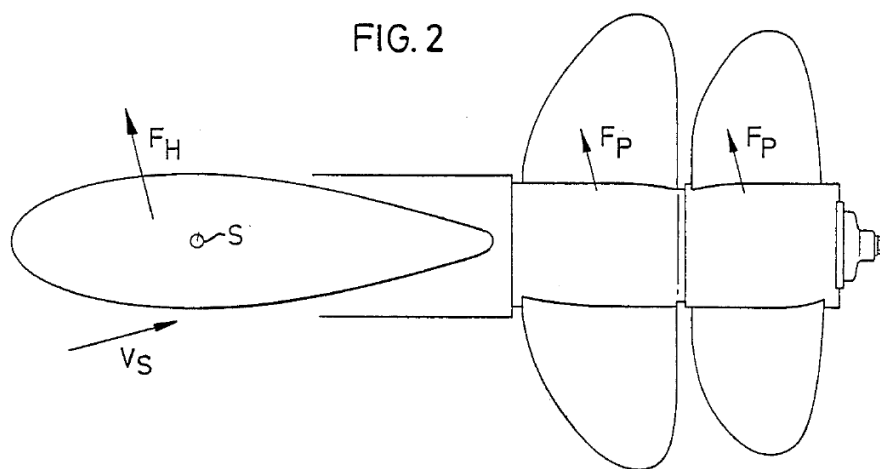


Figure 2 shows “a schematic cross-sectional profile of the underwater housing of the drive unit.” Ex. 1005, 2:57–58. Brandt states that one purpose of its invention is to

reduce the effect of . . . transverse forces on the steering torque exerted on the drive unit, so that both the shock loads during sharp turning man[euvers] and the steering forces during normal man[euvers] can be reduced to a level which permits the use of conventional cable steering even at high engine power.

Ex. 1005, 1:63–2:3. Discussing Figure 2, Brandt discloses that “forces F_H and F_P acting on the drive housing and the propellers respectively during a turning man[euver] exert . . . oppositely directed torques on the drive unit, as can be seen in FIG. 2, in which the arrow V_S indicates the direction of flow of the water.” *Id.* at 3:28–32. According to Brandt, with this configuration, “the shock loads during sharp man[euvers] are reduced by more than half and the steering forces in normal man[euvers] are reduced by about 30% over those in an unbalanced double propeller drive unit.” *Id.* at 3:32–37.

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*2. Analysis**a. Independent Claim 1*

Petitioner contends that Brandt, modified based on Kiekhaefer, satisfies each of the limitations of claim 1. Pet. 46–62. Petitioner identifies certain passages in the cited references and explains the significance of each passage with respect to the corresponding claim limitation. *Id.* Petitioner also articulates reasons to modify Brandt based on Kiekhaefer and argues that there would have been a reasonable expectation of success. Pet. 46–53. We address in turn below the subject matter of each element in claim 1, then Petitioner’s identified reasons to modify Brandt based on Kiekhaefer, and then objective evidence of nonobviousness.

(1) Element 1[p]

In element 1[p], claim 1 recites “[a] steerable tractor-type drive for a boat, comprising.” Ex. 1001, 5:48. Petitioner states that the proposed combination of Brandt and Kiekhaefer discloses this language because “(i) Brandt and Kiekhaefer both disclose steerable drives for a boat; (ii) Kiekhaefer specifically discloses a tractor-type drive; and (iii) the modification to Brandt . . . to flip the lower unit, as taught by Kiekhaefer, would have resulted in the combined Brandt-Kiekhaefer drive having all features of the preamble.” Pet. 53 (citation omitted) (citing Schofield Pet. Decl. ¶¶ 124–127). Patent Owner does not present arguments for this claim language. To the extent element 1[p] is limiting, we find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the proposed combination discloses this element.

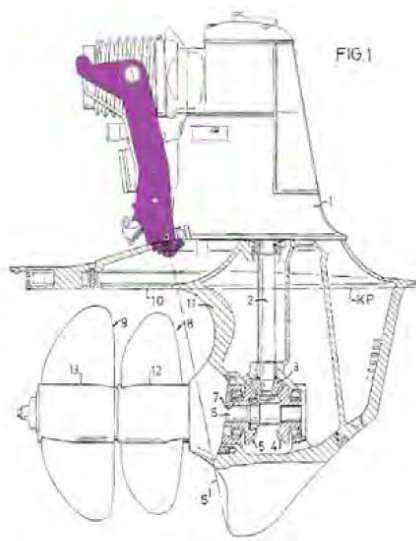
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(2) Element 1[a]

In element 1[a], claim 1 recites “a drive support mountable to a stern of the boat.” Ex. 1001, 5:49. Petitioner identifies the structure in purple on the following modified version of Figure 1 of Brandt, which generally depicts the proposed modified device:



Pet. 54. Prior to modification, Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit.” Ex. 1005, 2:55–56. In this modified version, Petitioner has generally reversed the direction of the structures below housing 1, removed a small fin, and highlighted structure in purple. *Compare* Ex. 1005, Fig. 1, with Pet. 52, 54. Petitioner highlights a disclosure in Brandt that “[t]he propeller drive unit shown in FIG. 1 is a so-called inboard-outboard drive unit, **designed to be mounted on a boat transom** and be connected to the output shaft of an engine (not shown).” Pet. 53 (quoting, with emphasis added, Ex. 1005, 2:59–62) (citing Ex. 1005, 3:38–4:1; Ex. 1007 at 4–5 (providing definitions of “hull” and “stern”)). According to Petitioner, the “Brandt-Kiekhäfer combination discloses a

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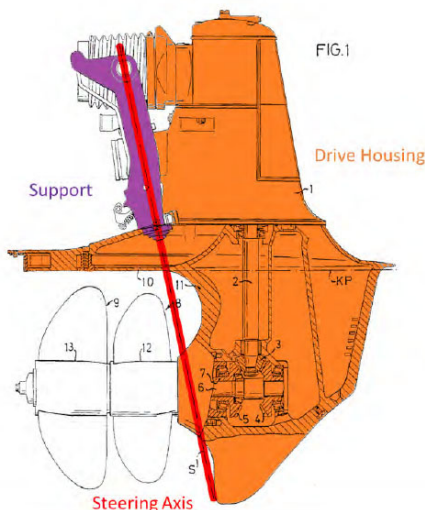
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drive support (purple) that gets mounted to the stern or transom of the boat.” Pet. 53–54 (citing Schofield Pet. Decl. ¶¶ 128–129). Patent Owner does not present arguments for this limitation. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the proposed combination discloses this element.

(3) Element 1[b]

In element 1[b], claim 1 recites “a drive housing pivotally attached to the support about a steering axis.” Ex. 1001, 5:50–51. Petitioner provides the following additional modified version of Figure 1 of Brandt, which generally depicts the proposed modified device:



Pet. 55. Prior to modification, Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit.” Ex. 1005, 2:55–56. In the modified version, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added a text box and purple highlighting for the “Support” from element 1[a], (4) added a text box and orange highlighting for a “Drive Housing,” and (5) added a text box and red line for a “Steering Axis.” Pet. 55.

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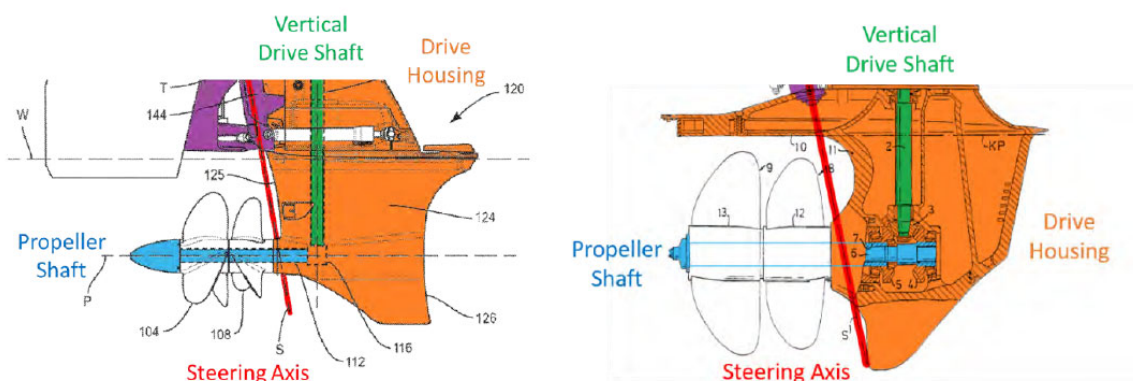
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According to Petitioner, this modified Figure 1 “shows a drive housing (orange) pivotally attached to the support (purple) about a steering axis (red).” Pet. 55. Petitioner relies on certain disclosures in Brandt, including one stating that “[t]he drive housing 1 **can pivot about an inclined axis S**, which, as is conventional, intersects the drive joint (not shown) between the engine and the drive unit.” Ex. 1005, 3:6–8, *cited at* Pet. 55 (also citing Ex. 1005, 1:8–13, 1:65–2:3; Schofield Pet. Decl. ¶¶ 130–131). Patent Owner does not present arguments for this limitation. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the proposed combination discloses this element.

(4) Element 1[c]

In element 1[c], claim 1 recites “the drive housing having a vertical drive shaft connected to drive a propeller shaft, the propeller shaft extending from a forward end of the drive housing.” Ex. 1001, 5:51–54. Petitioner provides the following side-by-side comparison of a modified version of Figure 3 from the ’692 patent (left-side figure) with a portion of an additional modified version of Figure 1 of Brandt (which generally depicts the proposed modified device) (right-side figure):



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Pet. 55. Prior to modification, Figure 3 of the '692 patent depicts a tractor-type drive for a boat (Ex. 1001, 2:34–34, 3:10–11) whereas Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit” (Ex. 1005, 2:55–56). In the modified version of Figure 1 of the '692 patent, Petitioner has (1) added purple highlighting for certain structure, (2) added a text box and orange highlighting for a “Drive Housing,” (3) added a text box and green highlighting for a “Vertical Drive Shaft,” (4) added a text box and blue highlighting for a “Propeller Shaft,” and (5) added a text box and red line for a “Steering Axis.” Pet. 58. In the modified version of a portion of Figure 1 of Brandt, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added purple highlighting for certain structure, (4) added a text box and orange highlighting for a “Drive Housing,” (5) added a text box and green highlighting for a “Vertical Drive Shaft,” (6) added a text box and blue highlighting for a “Propeller Shaft,” and (7) added a text box and red line for a “Steering Axis.” *Id.*

According to Petitioner, the portion of the modified version of Figure 1 of Brandt above shows “the housing (orange) has a vertical drive shaft (green) connected to drive a propeller shaft (blue) with a propeller.” Pet. 56 (also citing Ex. 1005, 1:8–11, claim 1). Petitioner adds that although Brandt “does not disclose that the propeller shaft extends from a forward end of the drive housing, when reversing Brandt’s lower unit by following Kiekhaefer’s teachings the Brandt-Kiekhaefer combination” on the right above “would have a propeller shaft extending from a forward end of the drive housing to receive one or more pulling- or tractor-type propellers, just

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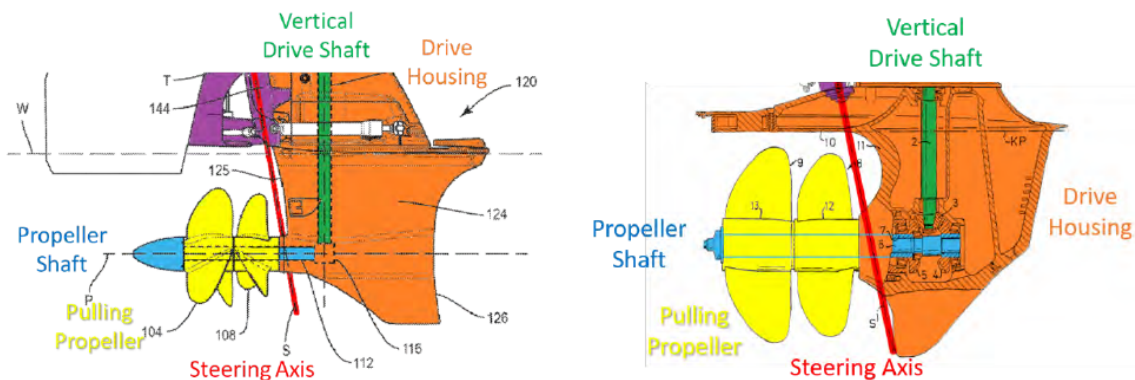
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like the '692 patent” as shown on the left above. Pet. 57 (citing Schofield Pet. Decl. ¶¶ 132–135). Patent Owner does not present arguments for this limitation. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the proposed combination discloses this element.

(5) Element 1[d]

In element 1[d], claim 1 recites “at least one pulling propeller mounted to the propeller shaft.” Ex. 1001, 5:55–56. Petitioner provides the following side-by-side comparison of a modified version of Figure 3 from the '692 patent (left-side figure) with a portion of an additional modified version of Figure 1 of Brandt (which generally depicts the proposed modified device) (right-side figure):



Pet. 59. Prior to modification, Figure 3 of the '692 patent depicts a tractor-type drive for a boat (Ex. 1001, 2:34–34, 3:10–11) whereas Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit” (Ex. 1005, 2:55–56). In the modified version of Figure 1 of the '692 patent, Petitioner has (1) added purple highlighting for certain structure, (2) added a text box and orange highlighting for a “Drive Housing,” (3) added a text box and green highlighting for a “Vertical Drive Shaft,” (4) added a text box and

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blue highlighting for a “Propeller Shaft,” (5) added a text box and yellow highlighting for “Pulling Propeller,” and (6) added a text box and red line for a “Steering Axis.” Pet. 59. In the modified version of a portion of Figure 1 of Brandt, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added purple highlighting for certain structure, (4) added a text box and orange highlighting for a “Drive Housing,” (5) added a text box and green highlighting for a “Vertical Drive Shaft,” (6) added a text box and blue highlighting for a “Propeller Shaft,” (7) added a text box and yellow highlighting for “Pulling Propeller,” and (8) added a text box and red line for a “Steering Axis.” *Id.*

Petitioner first highlights Kiekhaefer’s disclosure of “at least one pulling propeller” as shown in that reference’s Figure 4 and written description. Pet. 58–59 (citing Ex. 1004, 3:3–8, 3:20–22, Fig. 4). Citing to the section of the Petition discussing the alleged reasons to modify Brandt based on Kiekhaefer, Petitioner states that “there was ample motivation for [one of ordinary skill in the art] to modify Brandt by reversing its lower unit, in view of Kiekhaefer’s teachings on the advantages of pulling-type propellers and explanations as to how to create a reversible lower unit.” Pet. 59. According to Petitioner, “the Brandt-Kiekhaefer combination” on the right above “discloses at least one pulling propeller mounted to the propeller shaft, just like the ’692 patent” on the left above. Pet. 59–60 (citing Schofield Pet. Decl. ¶¶ 136–140). Patent Owner does not present arguments for this limitation. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the proposed combination discloses this element.

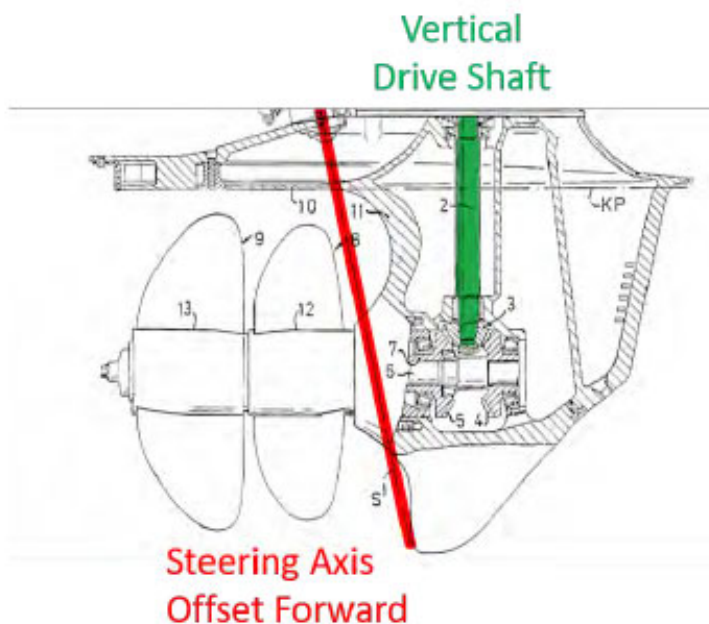
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(6) Element 1[e]

In element 1[e], claim 1 recites “wherein the steering axis is offset forward of the vertical drive shaft.” Ex. 1001, 5:57–58. Citing to the section of the Petition discussing the alleged reasons to modify Brandt based on Kiekhaefer and to the discussion of element 8[g], Petitioner states that “it would have been obvious to [one of ordinary skill in the art] to reverse the lower unit of Brandt’s drive to use a pulling-type/tractor-type propeller, as is taught by Kiekhaefer” and that, “in order to counteract a steering torque about the steering axis generated by the propellers during a turn, it would have been obvious for [one of ordinary skill in the art] to position the underwater housing (and its **drive shaft**) rearward of the steering axis.” Pet. 60–61 (citing Schofield Pet. Decl. ¶¶ 111–122, 141–144, 172–181). Petitioner then provides the following version of a portion of additional modified version of Figure 1 of Brandt, which generally depicts the proposed modified device:



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Pet. 61. Prior to modification, Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit.” Ex. 1005, 2:55–56. In the modified version, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added a text box and red line for “Steering Axis Offset Forward,” and (4) added a text box and green highlighting for a “Vertical Drive Shaft.” Pet. 61. According to Petitioner, “when reversing Brandt’s lower unit, [one of ordinary skill in the art] would have had ample motivation to offset the steering axis forward of the underwater housing that contains the vertical drive shaft in the Brandt-Kiekhaefer combination” as shown above. *Id.* Patent Owner does not present arguments for this limitation. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the proposed combination discloses this element.

*(7) The Modification of Brandt Based on
Kiekhaefer*

(a) Summary of the Proposed Modification

Discussing the reasons to modify Brandt based on Kiekhaefer, Petitioner first states that “Brandt and Kiekhaefer are analogous art to the claimed invention because they are within the **same field of endeavor** and **address the same problem.**” Pet. 47. According to Petitioner, the field of endeavor of the ’692 patent is “marine drives,” and “[b]oth Brandt and Kiekhaefer are within this same field of endeavor.” *Id.* (citing Ex. 1001, 1:6, 1:13–14; Ex. 1005, 1:8–9; Ex. 1004, 1:1–2). Petitioner also states that “Brandt and Kiekhaefer are reasonably pertinent to the problem identified in the ’692 patent of providing a marine drive that is more efficient with

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improved performance.” *Id.* (citing Ex. 1001, 3:10–14, 3:26–27) (discussing Schofield Pet. Decl. ¶ 113; Ex. 1005, 1:63–67; Ex. 1004, 3:7–8).

Next, Petitioner states that one of ordinary skill in the art “would have been motivated to modify Brandt based on Kiekhaefer’s teachings” because, although “Brandt discloses the use of pusher-type propellers, Kiekhaefer explains the benefits to using pulling-type/tractor-type propellers instead,” including greater efficiency and higher speeds. Pet. 47 (citing Ex. 1004, 1:1–13). Petitioner argues that one of ordinary skill in the art “would have been motivated to achieve these advantages for Brandt’s drive by modifying Brandt to use pulling-type/tractor-type propellers.” Pet. 47–48.

Petitioner then states:

at the very least, and given that Kiekhaefer only discloses two options (pusher-propeller or pulling-propeller), use of pulling-propellers with Brandt’s drive would have been obvious to try as there were a finite number of identified, predictable solutions (two options in Kiekhaefer, pusher-propeller or pulling-propeller), and there was a reasonable expectation of success in using either of these (Kiekhaefer specifically shows [one of ordinary skill in the art] how to design a drive that can be configured to use either pusher-type or pulling-type propellers). Additionally, or alternatively, the combination would have been an obvious result of substituting one known element (tractor-type-propeller) for another (pusher-type-propeller) to obtain predictable results (a boat that would have been more efficient and faster, per Kiekhaefer).

Pet. 48.

Petitioner then discusses the proposed modification, stating at the outset that, in modifying Brandt based on Kiekhaefer, one of ordinary skill in the art “would have been motivated to retain Brandt’s steering axis and would have constructed the lower unit of the modified Brandt-Kiekhaefer

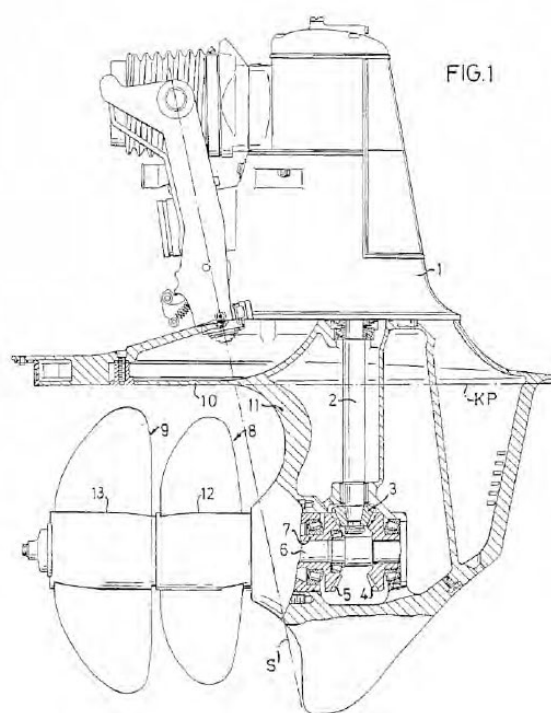
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system in a way that would have ensured balanced steering forces on the modified system's drive housing." Pet. 49; *see also* Pet. 49–53 (discussing the proposed modification).

As part of this discussion, Petitioner provides the following modified version of Figure 1 of Brandt, which generally depicts the proposed modified device:

**Brandt-Kiekhaefer Combination**

Pet. 52. Prior to modification, Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit.” Ex. 1005, 2:55–56. In the modified version, Petitioner has generally reversed the direction of the structures below housing 1 and removed a small fin. *Compare* Ex. 1005, Fig. 1, *with* Pet. 52. According to Petitioner, Kiekhaefer shows one of ordinary skill in the art “to retain the same steering axis in the pusher and

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pulling modes of its drive” and “Brandt expressly motivates [one of ordinary skill in the art] to ensure that steering forces are balanced and provides guidance on how to do so.” Pet. 49 (citing Ex. 1004, Figs 1, 2; Schofield Pet. Decl. ¶ 116) (discussing Ex. 1005, 1:54–61, 1:63–2:3, 2:12–29).

Petitioner states that one of ordinary skill in the art “would have followed Kiekhaefer’s instruction to use tractor-type/pulling-propellers (such as those shown in Kiekhaefer, or other such pulling propellers known to [one of ordinary skill in the art], such as those disclosed in Stechauner).” Pet. 52 (citing Schofield Pet. Decl. ¶¶ 111–122).

Petitioner then states that, “[i]n order to balance the propeller torque and torque created by the center-of-pressure, Brandt teaches moving the center-of-pressure of the underwater housing to the opposite side of the steering axis from the propellers by adjusting the surface area of the underwater housing” and states that, for a drive with a puller-type configuration, one of ordinary skill in the art “would have been motivated by Brandt’s teachings to ensure the center-of-pressure of the underwater housing is on the opposite side of the steering axis from the propellers, i.e., rearward of the steering axis to balance the torque created by the propellers forward of the steering axis.” Pet. 50 (citing Ex. 1005, 2:18–20). Petitioner adds that one of ordinary skill in the art:

would simply perform routine experimentation and modelling to the shape and leading edge of the symmetrical underwater housing such that the torque applied at the center-of-pressure applied by water moving past the drive housing during a turn is located rearward of the steering axis to counteract the opposite torque generated by the propellers forward of the steering axis.

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Pet. 50–51. According to Petitioner, Brandt teaches that one of ordinary skill in the art “would have been motivated to make this adjustment in order to reduc[e] the steering forces required for a turn such that conventional cable steering can be used.” Pet. 51 (citing Ex. 1005, 1:63–2:3; Schofield Pet. Decl. ¶¶ 172–181). Petitioner states that “it was well-known that by adjusting the configuration and position of the underwater gear case,” one of ordinary skill in the art “could relocate the drive unit center-of-pressure so that it generates a torque around the steering axis opposite the torque generated by the propeller during a turn.” *Id.* (citing Ex. 1005, 2:12–51; Schofield Pet. Decl. ¶ 120). Petitioner also describes “minor modifications” that one of ordinary skill in the art would have allegedly made to “improve operation of the modified drive.” Pet. 52–53.

(b) Arguments Addressing the Proposed Modification

Although Patent Owner questions whether one of ordinary skill in the art would have applied the teaching in Kiekhaefer as to reversing the lower unit of an outboard motor to a stern drive as in Brandt (*see, e.g.*, PO Resp. 40), Patent Owner does not challenge Petitioner’s assertion that Brandt and Kiekhaefer are at least reasonably pertinent to the claimed invention. *See* Pet. 47 (first two paragraphs); Pet. Reply 7 (“As a threshold matter, [Patent Owner] does not dispute that Brandt and Kiekhaefer are at least reasonably pertinent to the problem identified in the ‘692 Patent.” (citing PO Resp. 38–39)). For the reasons stated by Petitioner, we find that Brandt and Kiekhaefer are “reasonably pertinent to the problem identified in the ’692 patent of providing a marine drive that is more efficient with improved

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performance.” Pet. 47 (citing Ex.1001, 3:10–14, 3:26–27; Schofield Pet. Decl. ¶ 113; Ex. 1005, 1:63–67, Ex. 1004, 3:7–8).

Patent Owner presents four sets of arguments addressing Petitioner’s reasons to modify Brandt based on Kiekhaefer. *See* PO Resp. 31–51; PO Sur-reply 6–13. First, Patent Owner challenges Petitioner’s assertion that Kiekhaefer provides express motivation to modify the stern drive of Brandt. As summarized above, one of the reasons identified by Petitioner to modify Brandt based on Kiekhaefer is the express teaching in Kiekhaefer that puller-type propellers are “more efficient and capable of higher speeds” (Ex. 1004, 1:11–13), which, according to Petitioner, would have motivated one of ordinary skill in the art “to achieve these advantages for Brandt’s drive by modifying Brandt to use pulling-type/tractor-type propellers” and “in order to design a faster boat to meet th[e] commercial demand.” Pet. 47–48 (citing Schofield Pet. Decl. ¶ 114).

Patent Owner argues that “a desire to ‘increase speed’ is insufficient as an explanation for how and why Brandt should be modified in the manner in which the Petition suggests.” PO Resp. 38. In addition, Patent Owner argues that Petitioner inaccurately suggests there are only two solutions to improving speed by focusing solely on propeller orientation. *Id.* at 49–51. According to Patent Owner, by “identif[ying] only two options for propeller orientation,” Petitioner “oversimplifies the potential solutions by suggesting a binary choice to improve speed” even though “[t]he complexity of propulsion systems and the numerous variables that influence speed all impact the performance and operation of the systems.” *Id.* at 49 (citing 3d Winkel Decl. ¶ 92). “In other words,” Patent Owner states, “changing to a

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forward-facing (pulling-type) propeller arrangement is not the only way to achieve higher speeds and/or greater efficiency on a boat.” *Id.* (citing 3d Winkel Decl. ¶ 92).

This argument does not identify a deficiency in Petitioner’s position. Even if changing to a forward-facing propeller arrangement is “not the only way to achieve higher speeds and/or greater efficiency on a boat” (PO Resp. 49)—i.e., there are *other* factors and variables aside from propeller orientation that may influence the speed and efficiency of a boat—that does not undermine Kiekhäfer’s express teaching that changing to a forward-facing propeller arrangement *is one way* to provide a configuration that is “more efficient and capable of higher speeds.” Ex. 1004, 1:10–13; *see also* Pet. Reply 14 (stating that this argument by Patent Owner “misses the point that [one of ordinary skill in the art], after reading Brandt and Kiekhäfer (of which they are presumed to be aware), would have been motivated by Kiekhäfer’s express teachings to improve the Brandt drive to make it faster and more efficient”). Indeed, Patent Owner acknowledges (in the statement at the end of the prior paragraph) that a forward-facing (pulling-type) propeller arrangement *provides* higher speeds or more efficiency, but merely contends there are also *other ways*. *See* PO Resp. 49 (stating that “changing to a forward-facing (pulling-type) propeller arrangement is not the only way to achieve higher speeds and/or greater efficiency on a boat”).

In support of this point, Patent Owner highlights one of Petitioner’s websites, as well as statements by Mr. Schofield, that indicate that *other* factors—i.e., aside from propeller orientation—impact overall speed and efficiency. *See* PO Resp. 50–51 (citing Ex. 2014; Ex. 2028, 144:11–14; 3d

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Winkel Decl. ¶ 92). Again, that *other* factors aside from propeller orientation may also influence the speed and efficiency of a boat does not undermine Kiekhaefer’s express teaching that changing to a forward-facing propeller arrangement *is one way* to provide a configuration that is “more efficient and capable of higher speeds.” Ex. 1004, 1:10–13.

Next, we turn to Patent Owner’s and Dr. Winkel’s position that increased speed and greater efficiency is too generic to support modifying Brandt based on Kiekhaefer. *See* PO Resp. 38 (arguing that “a desire to ‘increase speed’ is insufficient as an explanation for how and why Brandt should be modified in the manner in which the Petition suggests”); 3d Winkel Decl. ¶ 92 (“Further, improved performance in terms of overall efficiency and/or greater attainable speed are generally desirable attributes of any type of propulsion system. This type of general reason is not sufficient to cause, direct, or motivate [one of ordinary skill in the art] to modify the rear-facing stern drive of Brandt in the same manner as the reversible lower unit of an outboard motor in Kiekhaefer.”), *cited at* PO Resp. 49–50.

As an initial matter, contrary to Patent Owner’s framing of the issue, the stated reason to modify Brandt based on Kiekhaefer is increased speed *and* increased efficiency (not just increased speed). *See* PO Resp. 38 (stating that “a desire to ‘increase speed’ is insufficient as an explanation for how and why Brandt should be modif[i]ed”). Moreover, the Federal Circuit recently addressed this issue, holding that a so-called “generic” motivation to combine—i.e., one that has broad appeal or applicability—is not deficient so long as it is supported by more than conclusory expert testimony. *See Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 797 (Fed. Cir. 2021) (stating

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that “[s]uch a rationale is not inherently suspect merely because it’s generic in the sense of having broad applicability or appeal” and that such “generic” improvements may support “a motivation to combine prior art references *even absent any hint of suggestion* in the references themselves”).

Here, unlike in the *Intel* decision, the motivation stems from an *express statement* in the prior art (i.e., Kiekhäfer) that changing to a forward-facing propeller arrangement is one way to provide a system that is “more efficient and capable of higher speeds.” Ex. 1004, 1:10–13. Based on this statement, Mr. Schofield stated that one of ordinary skill in the art “who would have wanted to improve efficiency and increase the speed of Brandt’s drive would have immediately considered modifying Brandt to use pulling-type/tractor-type propellers.” Schofield Pet. Decl. ¶ 114, *cited at* Pet. 47–48; *see also* Pet. Reply 14 (“Mr. Schofield testified that [increased speed and efficiency] are commercially desirable (citing Schofield Pet. Decl. ¶ 114)). This motivation is also supported by the testimony of Patent Owner’s own business manager, Mr. Andrew Sweet, who stated that “putting the propel[e]rs on the front of the stern drive created quite a bit of efficiency, in that there was nothing to block the flow of water to the propel[e]rs.” Ex. 1023, 43:3–9, *cited at* Pet. Reply 14. Patent Owner asserts that “maximum speed alone is neither the sole nor primary metric by which the performance of most recreational boats are judged,” but does not contest that speed is *a metric* by which boats are judged. *See* PO resp. 49–50. For these reasons, the express motivation relied upon in the Petition is supported by more than conclusory expert testimony.

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We turn now to Patent Owner’s argument that one of ordinary skill in the art would *not* have been motivated to modify Brandt as proposed based on Kiekhaefer’s express statement on the issue because Brandt relates to stern drives whereas Kiekhaefer relates to outboard motors. *See* PO Resp. 40 (“Kiekhaefer’s teaching regarding reversing the lower unit of an outboard motor is of little to no value to [one of ordinary skill in the art] when considering the rear-facing stern drive of Brandt.” (citing 3d Winkel Decl. ¶¶ 78, 79–92, 95, 97)). According to Patent Owner, “[t]here is no evidence in the record that [one of ordinary skill in the art] would have understood Kiekhaefer’s statement to apply to a forward-facing stern drive at all, much less why or under what conditions.” PO Sur-reply 6.

This argument does not identify a deficiency in Petitioner’s position. As an initial matter, for the reasons discussed above, Brandt and Kiekhaefer are analogous art, thus “a person of ordinary skill would have reasonably consulted . . . and applied their teachings in seeking a solution to the problem that the inventor was attempting to solve.” *Heidelberger Druckmaschinen AG v. Hantscho Com. Prod., Inc.*, 21 F.3d 1068, 1071 (Fed. Cir. 1994).

Moreover, as discussed on the prior page, both Mr. Schofield’s testimony and Mr. Sweet’s testimony support that the teachings of Kiekhaefer as to outboard motors—including the benefits of increased speed and efficiency—would have been understood to apply even to stern drives, as in Brandt. *See* Schofield Pet. Decl. ¶ 114, *cited at* Pet. 47–48; Pet. Reply 14; Ex. 1023, 43:3–9, *cited at* Pet. Reply 14. Although Patent Owner appears correct that Mr. Sweet is not a person of ordinary skill in the art, we

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view his statements—as to what “we” knew with regard to creating efficiency in stern drives—as indicating more than merely his *personal* knowledge on this issue. *See* Ex. 1023, 42:24–43:12 (discussing why “Volvo put its propel[e]rs, taking its traditional standard rear-facing propel[e]r design, why did they move the propel[e]rs to the front” and stating that “*we knew* from the IPS product that we have, that we had brought to market in 2005, that putting the propel[e]rs on the front of the stern drive created quite a bit of efficiency, in that there was nothing to block the flow of water to the propel[e]rs” (emphasis added)).

Moreover, the specific reason for increased efficiency mentioned by Mr. Sweet—the absence of structure to block the flow of water to the propellers (Ex. 1023, 43:7–9)—would apply whether an outboard motor *or* a stern drive is configured with forward-facing propellers. *See also* Ex. 1004, 3:7–8 (“*By disposing the propeller forwardly of gear case 11 greater efficiency and speed is obtained as would be desired where the motor is mounted on the racing boat 39 shown in Fig. 2.*” (emphasis added)), *cited at* Pet. Reply 15; Tr. 14:21–15:14 (discussing this issue).

Patent Owner also argues that the express motivation from Kiekhaefer is undermined because Petitioner did not redesign *its* stern drive with forward-facing propellers for speed or efficiency reasons (as relied upon in the Petition), but rather in response to a market allegedly created by Patent Owner. *See* PO Sur-reply 7 (“Further, significant evidence in the record demonstrates that Petitioner developed its Bravo Four S in response to Patent Owner’s success in the market. Petitioner has presented no evidence

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that it was driven by concerns of efficiency or speed when embarking on its copycat product.”).

This argument does not identify a deficiency in Petitioner’s position. The *actual* reason that Petitioner modified *its own* prior device(s) in a manner similar to the proposed modification does not undermine an adequately supported, *yet different*, reason that one of ordinary skill in the art at the time of the invention would have modified the relied-upon prior art references. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007) (“Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.”); *cf. Alcon Res., Ltd. v. Apotex, Inc.*, 687 F.3d 1362, 1368 (Fed. Cir. 2012) (“We have repeatedly held that the motivation to modify a prior art reference to arrive at the claimed invention need not be the same motivation that the patentee had.”).

As the second group of arguments, Patent Owner contends that Mr. Schofield’s testimony is “biased” and should be “given little to no weight.” PO Resp. 33–34; PO Sur-reply 8. Patent Owner states that Mr. Schofield is a “consultant” who has “has worked with [Petitioner] for decades and even relocated his home to be closer to one of [Petitioner’s] subsidiaries.” PO Resp. 33. Patent Owner adds that “Mr. Schofield has worked with [Petitioner] in litigation matters on approximately 15 cases over a ten-year period” and “has worked as an outside engineering consultant for [Petitioner] for over 20 years, including working directly with the vice president of engineering for one of Petitioner’s companies.” *Id.* (citing

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Ex. 2028, 8:23–25, 9:8–11, 12:20–23, 13:9–10). According to Patent Owner, “[s]uch a deep relationship with Petitioner calls into question the objectivity of Mr. Schofield’s testimony; in the present case, such biased testimony should be given little to no weight.” *Id.* at 33–34 (citing *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1322 (Fed. Cir. 2014)).

Although Mr. Schofield has previously performed consulting work for Petitioner and related corporate entities, we do not find this to warrant a conclusion that Mr. Schofield’s testimony, as a whole, is improperly tainted by bias. The *Apple* decision relied on by Patent Owner *does not* support the proposition that a declarant’s testimony should be given little to no weight simply based on past work with the same party or related entities. In fact, in that decision, the Federal Circuit reversed a district court’s exclusion of a party’s damages expert merely because the damages expert relied on a technical expert hired by the same party. *Apple Inc.*, 757 F.3d at 1322 (“A rule that would exclude Apple’s damages evidence simply because it relies upon information from an Apple technical expert is unreasonable and contrary to Rules 702 and 703 and controlling precedent.”).

On the facts here, we see no reason why Mr. Schofield’s *past* work with Petitioner or related entities makes his *current* testimony unhelpful in understanding the evidence. *See* Fed. R. Evid. 702(a). In assessing the merits of this proceeding, we have considered the proffered testimony from Mr. Schofield—as well as Patent Owner’s declarant Dr. Winkel—and accorded weight based on the testimony’s substantive persuasiveness. Patent Owner was afforded the opportunity to provide contrary expert testimony and to test the substance of Mr. Schofield’s testimony through

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cross-examination, both of which are traditional mechanisms to guard against deceptive testimony and which we are in a position to evaluate. We thus find insufficient basis to discount Mr. Schofield's opinions categorically, and we accord them due weight in this Decision.

Third, Patent Owner argues that Petitioner relies on "classic hindsight" and fails to adequately consider objective evidence of non-obviousness. *See* PO Resp. 36–39; PO Sur-reply 6–7. At the outset, Patent Owner summarizes its position as to the objective evidence here and states that "[t]his is the exact type of evidence that the Federal Circuit recognizes as a fundamental part of the overall Section 103 inquiry to serve as essential safeguards that **protect against hindsight bias.**" PO Resp. 36–38. We discuss Patent Owner's objective indicia below (*see* § II.E.2.a.8) and draw a conclusion as to the alleged obviousness after considering all the evidence of obviousness and nonobviousness together (*see* § II.E.2.a.9 (citing *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1079 (Fed. Cir. 2012))).

Next, Patent Owner contends that "[n]owhere does Petitioner sufficiently explain and prove **how and why** a person of ordinary skill in the art would have been motivated to select Brandt and Kiekhäfer for their disclosures, let alone to combine them in the ways proposed." PO Resp. 38 (citing Dec. Inst. 15; *Kinetic Techs. v. Skyworks Sols., Inc.*, IPR2014-00529, Paper 8 (PTAB Sept. 23, 2014)). Patent Owner contends that "Petitioner does not and cannot provide any rationale for why, starting with Brandt, [one of ordinary skill in the art] would look to Kiekhäfer to modify the

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Brandt stern drive to include a reversible lower unit.” *Id.* at 39 (citing 3d Winkel Decl. ¶¶ 74–78).

This argument does not identify a deficiency in Petitioner’s positions as to the alleged motivation to modify Brandt with Kiekhaefer. Instead, Patent Owner merely concludes that Petitioner’s discussion of motivation to combine is inadequate. As summarized above, Petitioner provides a thorough discussion of both why and how one of ordinary skill in the art would have modified Brandt based on Kiekhaefer. *See* Pet. 46–53; *In re Cree, Inc.*, 818 F.3d 694, 702 n.3 (Fed. Cir. 2016) (viewing an “impermissible hindsight” argument as “essentially a repackaging of the argument that there was insufficient evidence of a motivation to combine”)’ *see also* Pet. Reply 6–7 (“Here, the Petition describes in detail why Brandt and Kiekhaefer are analogous art, why [one of ordinary skill in the art] would be motivated to make the combination, and how the combination is made.” (citing Pet. 46–53)).

Patent Owner also argues that “[i]dentifying the field of endeavor as all marine drives ignores fundamental differences between the stern drives described in Brandt and Kiekhaefer’s outboard motor” in that “Brandt addresses optimizing the geometry of the stern drive and location of the steering axis to optimize effects of steering forces” whereas Kiekhaefer “focuses on the structure of its reversible lower unit and the effect of propellers in clean water.” PO Resp. 39 (citing Ex. 1005, 1:63–2:3; Ex. 1004, 1:1–20; 3d Winkel Decl. ¶¶ 77–79). To the extent this argument challenges whether Brandt and Kiekhaefer are analogous art to the ’692 patent, as discussed above, we find that the relied-upon references are at

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least reasonably pertinent to the '692 patent. *See* Pet. 47 (citing Ex. 1001, 1:6, 1:13–14, 3:10–14, 3:26–27; Ex. 1004, 1:1–2, 3:7–8; Ex. 1005, 1:8–9, 1:63–67; Schofield Pet. Decl. ¶ 113). As to the alleged “fundamental differences” discussed, Patent Owner has not adequately explained *why* the allegedly different “focuses” of the references would have undermined the proposed modification. Indeed, in the cited testimony Dr. Winkel mentions “steering forces” briefly (3d Winkel Decl. ¶ 77), but does not explain why the allegedly different “focuses” of Brandt and Kiekhäfer would undermine the proposed reasons to combine those references.

As to Petitioner’s reliance, in the Reply, on Stechauner as allegedly providing motivation to combine Brandt and Kiekhäfer (Pet. Reply 26–27), we view that as a new position not adequately stated in the Petition. *Cf.* Pet. 46–53; Consolidated Trial Practice Guide 73 (Nov. 2019), <https://www.uspto.gov/TrialPracticeGuideConsolidated> (“TPG”) (“Petitioner may not submit new . . . argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability.”).

As the fourth group of arguments, Patent Owner contends that, because “over two dozen modifications” would be required to modify the stern drive of Brandt based on Kiekhäfer, the proposed modification amounts to a “substantial reconfiguration” that “would cause the Brandt drive to be inoperable or destroy its intended function as well as causing it to be unsatisfactory for its intended purpose.” PO Resp. 39–40, 48; *see id.* at 39–49 (entire argument); PO Sur-reply 8–13. As part of this argument, Patent Owner contends that the proposed modification is a “complete redesign of Brandt” and asserts that “Petitioner’s expert identifies over two

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dozen modifications he would make to the proposed Brandt-Kiekhaefer combination to arrive at the claimed invention, but characterizes them all as ‘minor.’” PO Resp. 39. According to Patent Owner, “[s]tern drives as taught in Brandt are complex systems in which any adjustment of one variable can affect the performance of the entire system” and that, here, the “geometry of the lower unit as a whole would need to be redesigned” and “the configuration and routing of other systems and components such as cooling water ducts, exhaust ducts, and gearshift cables would need to be reconfigured and redesigned.” *Id.* at 40 (citing 3d Winkel Decl. ¶¶ 78, 79, 84–87, 90, 92). Patent Owner contends that “in order to achieve the purposes of Brandt in optimizing the geometry and location of the steering axis to optimize effects of steering forces (Ex. 1005, 1:63–2:3), substantial reconfiguration of the drive will be required.” *Id.* (citing 3d Winkel Decl. ¶¶ 80, 81, 85, 87; *In re Ratti*, 270 F.2d 810, 813 (CCPA 1959)). Patent Owner then provides (1) a side-by-side comparison of Figure 1 of Brandt with the proposed modified stern drive, identifying “other visible adjustments” and (2) a list of the “over two dozen changes” identified by Mr. Schofield. PO Resp. 41–46 (citing 3d Winkel Decl. ¶¶ 84, 85, 90; Ex. 2028 (deposition testimony of Mr. Schofield)).

These arguments do not identify a deficiency in Petitioner’s positions. We first discuss Petitioner and Mr. Schofield’s position as to the proposed modification. Petitioner and Mr. Schofield provide a lengthy discussion of the overall modification, with Mr. Schofield summarizing the proposed modification as follows: “remove and reverse the lower portion of Brandt’s drive and replace the pusher-propeller(s) with puller- or tractor-propeller(s),

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while also ensuring balanced steering forces as taught by Brandt, to produce the Brandt- Kiekhaefer combination.” Schofield Pet. Decl. ¶ 121; Pet. 46–52 (discussing aspects of the proposed combination); *see also* Ex. 2028, 138:10–11 (Mr. Schofield testifying that the proposed modified device “would work simply with flipping the thing around”). Then, *after* this discussion, Petitioner and Mr. Schofield identify certain “other minor modifications” that “improve operation of the modified drive.” Pet. 52–53; Schofield Pet. Decl. ¶ 122. Contrary to Patent Owner’s position, not all of the listed changes (PO Resp. 43–45) are *required* “to arrive at the claimed invention.” *Cf. id.* at 46. For example, although the proposed modification requires rotating the lower unit in Brandt 180 degrees to arrive at the claimed invention (*see id.* at 43 (first bullet)) the claimed invention *does not* specify a location for exhaust pipes (*see id.* at 45 (last bullet)).

The record supports Petitioner’s position that the “minor modifications” identified by Mr. Schofield were ones that one of ordinary skill in the art “*might also* consider when reversing the Brandt lower unit,” but that “were not required.” Pet. Reply 13 (emphasis added). For example, in a cited portion of his declaration, Mr. Schofield characterized these as “minor modifications” that “improve operation of the modified drive,” were “well within the knowledge of [one of ordinary skill in the art], and would not require undue experimentation.” Schofield Pet. Decl. ¶ 122, *cited at* Pet. 52–53; *see also* Ex. 2028, 137:8–12 (discussing Schofield Pet. Decl. ¶ 122). In addition, in a statement in his deposition testimony highlighted by Patent Owner at the oral argument (Tr. 71:8–10), Mr. Schofield states that these changes are “required,” but, in the next statement, Mr. Schofield makes clear

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that these changes are only “necessary to make it optimal” and also that they are “fairly minimal.” Ex. 2028, 138:9–13 (emphasis added).

In addition, the record supports Petitioner and Mr. Schofield’s position that all of the listed changes—those needed to arrive at the claimed invention and those merely to optimize the modified device—were within the scope of the knowledge of one of ordinary skill in the art. For example, as to the necessary parts of the modification, Mr. Schofield states that “[b]ecause Kiekhaefer provides guidance on reversing a lower unit, [one of ordinary skill in the art] would have modified Brandt to use pulling propellers with a reasonable expectation of success by reversing Brandt’s lower drive unit and using a tractor-type propeller, as taught by Kiekhaefer.” Schofield Pet. Decl. ¶ 115 (citing Ex.1004, 1:17–20 (“Another object is to provide for **reversing the lower unit** of an outboard motor to receive a tractor propeller **without requiring any extra parts or extensive disassembly of the motor.**” (emphasis added))). Mr. Schofield also discusses at length how “Brandt expressly motivates [one of ordinary skill in the art] to ensure that steering forces are balanced and provides guidance on how to do so.” *Id.* ¶ 116; *see also id.* ¶¶ 117–120 (discussing this aspect of Brandt). Then, in discussing the changes that “merely improve the operation and efficiency of the drive, but are not required,” Mr. Schofield states that those modifications “would have been obvious design changes well within the knowledge of [one of ordinary skill in the art], and would not require undue experimentation.” *Id.* ¶ 122, *cited at* Pet. 52–53. And in his deposition, Mr. Schofield adds that “these are fairly easy design changes that

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anybody in the shop could do if they put their mind to it.” *See* Ex. 2028, 138:1–3, *cited at* Pet. Reply 9.

In the testimony cited by Patent Owner (*see* PO Resp. 39–46), Dr. Winkel states that “[r]edesigning a drive from a rearward facing propeller (*e.g.*, Brandt) to a forward-facing propeller is *not a simple engineering task*” (3d Winkel Decl. ¶ 78 (emphasis added)) and discusses several technical considerations in performing that task, but does not adequately explain why addressing those considerations in the context of the proposed modification would be *outside* the abilities of one of ordinary skill in the art, as defined above. *See, e.g.*, 3d Winkel Decl. ¶ 79 (discussing how the “tear-drop” shape of the profile of the lower unit in Brandt would be “less efficient in the proposed reversed direction”), ¶ 80 (discussing how “[t]he ducting and geometry of the exhaust system would need to be reconfigured and redesigned before an inverted Brandt drive could be considered feasible”), ¶ 81 (discussing how “the upper portion of the drive housing or the lower gear housing or both would need to be reconfigured in some manner not addressed by Mr. Schofield” and how the modified device “would require additional bearings and gears to transmit power between the offset and misaligned drive shaft sections”), ¶ 85 (discussing how allegedly necessary modifications to the vertical drive shaft and horizontal input shaft “would require that the position of gears, bearings, and carriers would need to be adjusted and reconfigured as well”), ¶ 86 (discussing how “the introduction of exhaust gas into the propeller flow would create issues and the propulsive efficiency would be considerably reduced in such a configuration”), ¶ 87 (discussing potential “interference issues between the hull and drive

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components such as the ventilation plate and propellers”), ¶ 90 (discussing how “the configuration and routing of other systems and components such as cooling water ducts, exhaust ducts, and gear-shift cables would need to be reconfigured and redesigned”). Petitioner raises this point in the Reply and Patent Owner does not adequately address this issue in the Sur-reply. *See* Pet. Reply 9 (arguing that Patent Owner “claims that reversing the lower unit of Brandt requires changes to internal components (PO [Resp.] 45–48), but never argues that any of those changes would be outside the knowledge and skill of [one of ordinary skill in the art] or require undue experimentation”); *cf.* Schofield Pet. Decl. ¶ 18 (providing Mr. Schofield’s un rebutted testimony that a person having ordinary skill in the art would be a degreed naval architect, marine engineer, or the like).

The finding that the listed changes are within the level of ordinary skill in the art is further supported by the fact that the ’692 patent does not include details about many of the “minor modifications,” such as the routing of cooling water (as confirmed by Dr. Winkel’s testimony). *See* Pet. Reply 9–10 (citing Ex. 1024, 183:23–184:9, 184:13–185:2, 185:21–186:4); *see also* *Smith & Nephew, Inc. v. Rea*, 721 F.3d 1371, 1381–82 (Fed. Cir. 2013) (addressing a patent owner’s argument as to an alleged technical issue in the proposed combination, stating that “[t]his naturally raises the question of how [patent owner] managed to make such a combination work”).

Rather than explain why the changes are outside the level of ordinary skill in the art, Patent Owner appears to assert that the sheer number of modifications precludes performance of the proposed modification. *See* PO Resp. 46 (“The numerous changes required to combine the two references to

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arrive at the claimed invention confirm the complexity of the proposed modification and demonstrate that proposed modification would be anything but obvious to” one of ordinary skill in the art and stating that “the over two dozen modifications Mr. Schofield described” reinforces that one of ordinary skill in the art “would have no reasonable [expectation] that the proposed modification to Brandt would be successful” (citing 3d Winkel Decl. ¶ 90)). As discussed above, many of the listed changes are not necessary, but merely proposed to optimize the proposed modification. If the listed changes are within the level of skill in the art (as we find they are) and one of ordinary skill in the art would have had a reason to make the proposed modification (as we find overall in the context of this section), we see no reason (and Patent Owner has identified no case law supporting) that the *sheer number* of changes precludes a finding of obviousness, especially in the mechanical arts. *See KSR*, 550 U.S. at 418 (stating that the obviousness analysis “can take account of the inferences and creative steps that a person of ordinary skill in the art would employ”); *see also id.* at 421 (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”).

We turn now to the arguments that Petitioner has not demonstrated obviousness in that the proposed modification, including the “minor modifications,” (1) is an “improper” “substantial reconfiguration of the drive” (PO Resp. 40–41 (citing *In re Ratti*, 270 F.2d 810, 813 (CCPA 1959))), (2) would render the Brandt device “unsatisfactory for its intended purpose – that is providing a stern drive unit that reduces the effect of the transverse forces on the steering torque exerted on the drive unit” (PO Resp

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48 (citing Ex. 1005, 2:60–64; 3d Winkel Decl. ¶ 91; *In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984))), and (3) “would cause the Brandt drive to be inoperable or destroy its intended function” (PO Resp. 49 (*In re Fritch*, 972 F.2d 1260, 1265 n.12 (Fed. Cir. 1992))).

We first address *In re Ratti*. For the reasons discussed above, we find that all the listed changes are within the level of ordinary skill in the art, and thus not a “substantial reconstruction and redesign” as that phrase is used on the cited page of *In re Ratti*. For example, in a subset of the testimony cited by Patent Owner as discussed above (*compare* PO Resp. 39–46, *with id.* at 46–48 (citing 3d Winkel Decl. ¶¶ 81–85)), Dr. Winkel discusses several technical considerations in performing the proposed modification, but does not adequately explain why addressing those considerations in the context of the proposed modification would be *outside* the abilities of one of ordinary skill in the art, as defined above, or represent a “substantial reconstruction and redesign.”

In addition, under *In re Ratti*, a proposed modification that changes the “basic principles under which the [prior art] was designed to operate” may not support a conclusion of obviousness. *In re Ratti*, 270 F.2d at 813. In this context, “a change in the basic principles” refers to a change that is fundamental in scope so as to relate to scientific or technical principles under which the invention is designed to operate. *Id.* (“This suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the modified prior art] as well as a change in the basic principles under which the [modified prior art] . . . was designed to operate.”). Patent Owner has not adequately explained how the

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listed changes impact the “basic principles” under which Brandt operates. *See, e.g.*, PO Resp. 39–41.

We address Patent Owner’s arguments as to *In re Gordon* and *In re Fritch* together. Here, we agree with Petitioner that, contrary to Patent Owner’s argument, the Brandt drive *after* modification with Kiekhaefer continues to perform the stated purpose and function of Brandt (even as phrased by Patent Owner): “providing a stern drive unit that reduces the effect of the transverse forces on the steering torque exerted on the drive unit.” PO Resp. 48 (citing Ex. 1005, 2:60–64)¹⁶; Pet. Reply 8 (arguing that Patent Owner “fails to identify how any such changes would impact the ability to balance the steering forces on the Brandt-Kiekhaefer drive”). As discussed above, Petitioner and Mr. Schofield discuss at length why the proposed modified device would have retained this feature of Brandt. *See* Pet. 49 (“*Fourth*, in modifying Brandt in view of Kiekhaefer, [one of ordinary skill in the art] would have been motivated to retain Brandt’s steering axis and would have constructed the lower unit of the modified Brandt-Kiekhaefer system in a way that would have ensured balanced steering forces on the modified system’s drive housing.”), 49–51 (entire discussion) (citing Schofield Pet. Decl. ¶¶ 116–121). Patent Owner does not challenge this aspect of the proposed modification, which we find supported by the record.

¹⁶ We understand Patent Owner to have intended to cite column 1, lines 63 to 67 of Brandt, which provides: “The purpose of the present invention is to achieve a propeller drive unit of the type described by way of introduction, which makes it possible to reduce the effect of the transverse forces on the steering torque exerted on the drive unit”

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In the Reply, Petitioner discusses the so-called “Crusty Drive Demonstration,” in which Petitioner “acquired a Volvo Penta Duoprop drive and reversed the lower housing so that the propellers faced forward, i.e., converted a rear-facing propeller configuration to a front-facing propeller configuration.”¹⁷ Pet. Reply 10–12 (citing Ex. 1025 ¶¶ 26–29, 31); *see* PO Sur-reply 8–11 (addressing the “Crusty Drive Demonstration”). According to Petitioner, “[t]he modified drive operated as expected” in that the input shaft could turn the counter-rotating propeller shafts. Pet. Reply 11–12 (citing Ex. 1033 (video showing operation of the Crusty Drive propeller shafts)). Petitioner asserts that “[r]eversing Brandt’s lower unit, as taught by Kiekhaefer, is not complex and does not require significant modifications to the overall structure and configuration of the drive.” *Id.* at 12.

Patent Owner responds that the Crusty Drive does not support that the proposed modification was “simple and routine.” PO Sur-reply 8–11. Patent Owner highlights potential limitations of the Crusty Drive Demonstration as supporting Petitioner’s position, including that (1) the Drive was “never installed on a boat,” (2) the Drive was “never connected to an engine, steering or trim system,” (3) “[n]o propellers were installed on the drive,” (4) “no cooling water or engine exhaust was ever passed to or from the engine through the drive” and (5) the Drive was “never tested.” PO Sur-reply 9–10 (citing Ex. 2056, 27:5–7, 29:13–30:8). Although we do not rely on the Crusty Drive Demonstration to support the finding that the proposed

¹⁷ According to Petitioner, Patent Owner “admits the Volvo Penta Duoprop drive is the same drive depicted in Brandt.” Pet. Reply 10 (citing PO Resp. 35).

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modification would have been within the knowledge of one of ordinary skill in the art, we note that such a working demonstration (or “proof of concept” (Tr. 97:9)) of the proposed modification is *not necessary* to support a conclusion of obviousness.

Next, Patent Owner argues that “Brandt is over 30 years old and Kiekhaefer is over 70-years old, yet no one in the industry combined the teachings of the two references” and asserts the fact that “no one developed and marketed the claimed subject-matter until years after the Patent Owner had created the market further illustrates that [one of ordinary skill in the art] at the time of invention would not have combined the references as Petitioner proposes.” PO Sur-reply 11–12 (citing *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957–58 (Fed. Cir. 1997)).

This argument does not show a deficiency in Petitioner’s position. Although the *Arkie Lures* decision does mention that “the years of use of salty bait and of plastic lures, without combining their properties, weighs on the side of nonobviousness of the combination” (119 F.3d at 957–58), the Federal Circuit’s predecessor has more directly addressed the issue, stating that “[t]he mere age of the references is not persuasive of the unobviousness of the combination of their teachings, absent evidence that, notwithstanding knowledge of the references, the art tried and failed to solve the problem.” *In re Wright*, 569 F.2d 1124, 1127 (CCPA 1977).

For the reasons above, we determine, in light of the complete record, that Petitioner has shown by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have had reason to modify Brandt based on Kiekhaefer, as proposed, that the articulated

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reasoning is supported by rational underpinning, and that there would have been a reasonable expectation of success in the proposed modification. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), *cited with approval in KSR*, 550 U.S. at 418.

(8) Objective Indicia of Nonobviousness

We next turn to Patent Owner’s objective evidence of nonobviousness and Petitioner’s rebuttal evidence. Objective evidence of nonobviousness, when present, must be considered as part of an obviousness inquiry.

Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc., 699 F.3d 1340, 1349 (Fed. Cir. 2012). Notwithstanding what the teachings of the prior art would have suggested to one of ordinary skill in the art, the totality of the evidence submitted, including objective evidence of nonobviousness, may lead to a conclusion that one or more of the challenged claims would not have been obvious to one of ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984).

“In order to accord substantial weight to secondary considerations in an obviousness analysis, the evidence of secondary considerations must have a nexus to the claims, i.e., there must be a legally and factually sufficient connection between the evidence and the patented invention.” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019), *cert. denied*, 141 S. Ct. 373 (2020). Applying *Fox Factory*, the Board uses a two-step analysis in evaluating nexus between the claimed invention and objective evidence of nonobviousness. *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 33 at 33 (PTAB Jan. 24, 2020) (precedential). We first consider whether the patent owner has demonstrated “that its products are coextensive (or nearly coextensive) with the challenged claims,” resulting in

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a rebuttable presumption of nexus. *Id.* If not, that does not end the inquiry; “the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the ‘direct result of the unique characteristics of the claimed invention.’” *Id.* (quoting *Fox Factory*, 944 F.3d at 1373–75).

Patent Owner produces evidence directed to alleged commercial success, copying, industry praise, skepticism, long-felt but unsolved need, and failure of others. PO Resp. 51–63; PO Sur-reply 13–25. We address each of these, in turn, below. But first, we address nexus.

(a) Nexus

“The patentee bears the burden of showing that a nexus exists.” *Fox Factory*, 944 F.3d at 1373 (quoting *WMS Gaming Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999)). We first address whether Patent Owner is entitled to a rebuttable presumption of nexus. As stated in *Fox Factory*, “presuming nexus is appropriate when the patentee shows that the asserted objective evidence is tied to a specific product and that product embodies the claimed features, and is coextensive with them.” *Id.* (quotations omitted), *quoted at* PO Resp. 52. Patent Owner asserts that both its “Forward Drive” and Petitioner’s Bravo Four S¹⁸ are entitled to a presumption of nexus. As to the Forward Drive, Patent Owner provides this discussion:

Volvo Penta’s Forward Drive is a commercial embodiment of the ’692 Patent and coextensive with the claims.

¹⁸ We will refer to the Forward Drive as Patent Owner’s and the Bravo Four S as Petitioner’s even though each may technically be an offering from a related corporate entity.

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Ex. 2027, ¶ 51. The design of the Forward Drive has not fundamentally changed since its launch in 2015. Ex. 2029, ¶ 9. The presumption of nexus thus applies to the objective indicia associated with the Forward Drive.

PO Resp. 52. Petitioner responds that coextensiveness is a separate requirement for a presumption of nexus and that Patent Owner has not established coextensiveness. *See* Pet. Reply 16 n.4.

We agree with Petitioner that Patent Owner has not established a presumption of nexus as to the Forward Drive. As noted by Petitioner (Pet. Reply 16 n.4), the Federal Circuit has made clear that the coextensiveness requirement is separate from the requirement that the product or process embodies the claims. *See Fox Factory*, 944 F.3d at 1377 (“We reject [the patent owner’s] attempt to reduce the coextensiveness requirement to an inquiry into whether the patent claims broadly cover the product that is the subject of the evidence of secondary considerations.”). Here, Patent Owner concludes that the “Forward Drive is a commercial embodiment of the ’692 Patent and coextensive with the claims” and cites to one paragraph of one of Dr. Winkel’s Declarations. PO Resp. 52 (citing 3d Winkel Decl. ¶ 51). Even assuming that this reliance on Dr. Winkel’s Declaration is not improper incorporation by reference (Pet. Reply 16 n.4 (citing 37 C.F.R. § 42.6(a)(3))), Dr. Winkel (via his Appendix C) addresses why the Forward Drive embodies the claims, but does not even mention, let alone provide testimony supporting Patent Owner’s conclusion regarding, the *separate* coextensiveness requirement. *See* 3d Winkel Decl. ¶ 51.

Moreover, as argued by Petitioner, the record supports that the Forward Drive is *not* coextensive with the claims. *See* Pet. Reply 16 n.4. “A patent claim is not coextensive with a product that includes a ‘critical’

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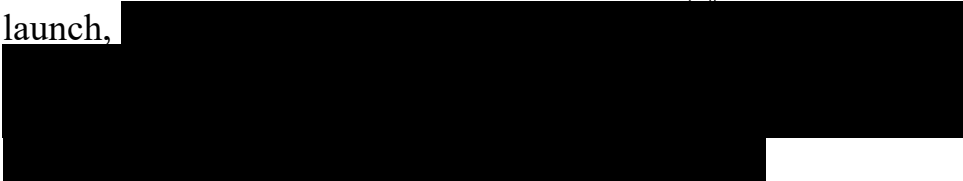
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unclaimed feature that is claimed by a different patent and that materially impacts the product's functionality.” *Fox Factory*, 944 F.3d at 1375. As highlighted by Petitioner in the Reply, Patent Owner expressly stated, in an issue of “Volvo Group magazine,” that the Forward Drive “includes several patented features that make the drive stand out,” such as exhaust-related features, which are not claimed in the ’692 patent. Ex. 1013 at 34, *cited at* Pet. Reply 16 n.4. Patent Owner does not address this issue in the Sur-reply. We determine that these features, apparently claimed in patents other than the ’692 patent, “materially impact[]” the Forward Drive’s functionality in that they “make the drive stand out.” *Fox Factory*, 944 F.3d at 1375; Ex. 1013 at 34. Further supporting this finding is that the Volvo Group magazine (and its discussion of “patented features”) published in March 2015—years before the issuance of the ’692 patent (April 2017). *See* Ex. 1013; Pet. Reply 16 n.4 (citing various exhibits showing that Volvo called its Forward Drive “patented” before issuance of the ’692 patent).

As to whether Patent Owner is entitled to a presumption of nexus as to the Bravo Four S, Patent Owner provides this discussion:

The Bravo Four S also embodies the claimed features of the ’692 Patent and is coextensive with them. Ex. 2027, ¶ 119–120. Since launch,



PO Resp. 52–53 (citing Ex. 2040 at 12 and district court decisions on commercial success).

We determine that Patent Owner has not established a presumption of nexus as to the Bravo Four S. Patent Owner concludes that the “Bravo Four

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S also embodies the claimed features of the '692 Patent and is coextensive with them” and cites to two paragraphs of the Third Winkel Declaration. PO Resp. 52–53 (citing 3d Winkel Decl. ¶¶ 119–120)). Even assuming again that this reliance on Dr. Winkel’s Declaration is not improper incorporation by reference (Pet. Reply 16 n.4 (citing 37 C.F.R. § 42.6 (a)(3))), Dr. Winkel (via his Appendix D) addresses why the Bravo Four S embodies the claims, but Dr. Winkel does not even mention, let alone provide testimony supporting Patent Owner’s conclusion regarding, the *separate* coextensiveness requirement. *See* 3d Winkel Decl. ¶¶ 119–120.

Having determined that Patent Owner has not established a presumption of nexus as to either the Forward Drive or Bravo Four S, we turn to the second option to establish nexus: whether Patent Owner has shown “that the evidence of secondary considerations is the ‘direct result of the unique characteristics of the claimed invention’” as to either product. *Lectrosonics*, IPR2018-01129, Paper 33 at 33 (quoting *Fox Factory*, 944 F.3d at 1373–75). We reproduce below the entirety of Patent Owner’s discussion in the Response as to this second option:

Further, the secondary considerations here are the “direct result of the unique characteristics of the claimed invention.” *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996). For example, Brunswick recognized that the success of Volvo Penta’s Forward Drive was tied directly to the claimed features, namely a steerable tractor-type drive as recited in each of the challenged claims. *See, e.g.*, Ex. 2039 at 2–4.

PO Resp. 53.

Petitioner highlights case law discussing establishing nexus from objective evidence to the “merits of the claimed invention” and argues that the “merits” refers to claimed features *not* in the prior art. *See* Pet. Reply

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15–17 (discussing Ex. 1003 at 56 (distinguishing the prior art reference to Steyr)). Petitioner asserts that because, during prosecution, Patent Owner only identified a steering axis forward of the vertical drive shaft (and underwater drive housing) as a claim feature not in the prior art, Patent Owner must link *that* feature to the objective evidence. *See id.* at 17 (“Thus, according to [Patent Owner], the merit of the claimed invention is a steering axis forward of the vertical drive shaft (and underwater drive housing).”). Petitioner then argues that Patent Owner has not shown that any objective indicia relates to that alleged “unique characteristic[] of the claimed invention.” *See id.* at 17–26. Patent Owner responds that the nexus need not necessarily link a specific claim limitation to the proffered objective evidence. *See* PO Sur-reply 16–19 (discussing Federal Circuit case law).

As an initial matter, we agree with Patent Owner’s understanding of the law of nexus as applicable here. For example, as noted by Patent Owner, in *Chemours Co. FC, LLC v. Daikin Industries, Ltd.*, 4 F.4th 1370, 1377 (Fed. Cir. 2021), the Federal Circuit reversed a Board determination of no nexus when the Board had considered nexus on a “limitation-by-limitation basis, rather than the invention as a whole.” The Federal Circuit added that “[e]vidence of commercial success . . . can be linked to an ‘inventive combination of known elements’ to show a sufficient nexus.” *Id.* at 1378. In the Sur-reply to the Motion to Amend, Petitioner seeks to distinguish *Chemours* because the claimed combination there involved three “interdependent properties” not present on the facts here. MTA Sur-reply 9–10. We do not read the legal proposition in that decision as applying to its “unique combination of three interdependent properties,” but instead as

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applying to situations involving a “unique combination of known elements from the prior art.” *Chemours*, 4 F.4th at 1378.

Further, the decisions in *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324 (Fed. Cir. 2019), and *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317 (Fed. Cir. 2016), cited in the Sur-reply, also support Patent Owner’s position. See PO Sur-reply 17–18. Although these decisions primarily deal with the presumption of nexus (as noted by Petitioner (MTA Sur-reply 10)), we find their discussions of this issue instructive and as supporting Patent Owner’s view that nexus need not be limited to a novel feature not found in the prior art. See *WBIP*, 829 F.3d at 1330 (“Where the allegedly obvious patent claim is a combination of prior art elements, we have explained that the patent owner can show that it is the claimed combination as a whole that serves as a nexus for the objective evidence; proof of nexus is not limited to only when objective evidence is tied to the supposedly new feature(s).” (quotations omitted)), *quoted at Henny Penny*, 938 F.3d at 1333; *see also WBIP*, 829 F.3d at 1331 (“We further reject [patent challenger’s] categorical claim that objective evidence must be tied exclusively to claim elements that are not disclosed in a particular prior art reference in order for that evidence to carry substantial weight.”).

As argued by Patent Owner, in *GPAC*, relied on by Petitioner (Pet. Reply 16), the Federal Circuit did not link any *specific* claim limitations to the “merits of the claimed invention.” See PO Sur-reply 18 (“*GPAC* did not describe the ‘merits of the claimed invention’ as claim limitations which, in isolation, are alleged to be missing in the prior art.”); *GPAC*, 57 F.3d at 1580. Although the decision in *Merck & Cie v. Gnosis S.p.A.*, 808 F.3d 829

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(Fed. Cir. 2015) does discuss case law addressing nexus based on a feature that is, e.g., “*novel* in the claim” (*id.* at 837), we do not view that discussion as limiting nexus to *only* such a showing. *See WBIP*, 829 F.3d at 1330 (stating that “proof of nexus is not limited to only when objective evidence is tied to the supposedly new feature(s)”).

With that understanding of this aspect of the law of nexus, we turn back to Patent Owner’s two-sentence discussion of the issue, shown in the block quote above (from page 53 of the Patent Owner Response). We understand Patent Owner to rely on the claimed combination as a whole as the basis for the nexus, however, Patent Owner does not actually identify the “unique characteristics” of the claimed combination (PO Resp. 53)—i.e., the “merits of the claimed invention” (*In re Huang*, 100 F.3d at 140)—that allegedly lead to the objective evidence here. *See, e.g., WBIP*, 829 F.3d at 1331 (discussing how the patent owner “argues that it is the claimed combination which results in a low-carbon monoxide emission marine genset which is the ‘merits of the claimed invention’”).

Instead, in the second sentence of the discussion, Patent Owner cites to three pages of an internal document of Petitioner discussing the objective of delivering a [REDACTED]

[REDACTED] Ex. 2039 at 2, *cited at* PO Resp. 53. Although that document clearly references the Forward Drive that Patent Owner argues—and Petitioner does not dispute—practices the claims of the ’692 patent, Patent Owner has not adequately identified or explained how the specific “capabilities” of the Forward Drive sought to be matched by Petitioner (whatever they may be) result from or are required by the

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claims in the '692 patent. *Cf. Lectrosonics*, IPR2018-01129, Paper 33 at 33 (finding no nexus when the evidence presented related to “features that are not required by the claims”).¹⁹ For these reasons, on the record here, we determine that Patent Owner has not established a nexus for either the Forward Drive or the Bravo 4S. Regardless, to present a full discussion of the issues, we discuss the objective indicia evidence below as if Patent Owner *had* established nexus.

(b) Copying and Commercial Success

“‘Copying may indeed be another form of flattering praise for inventive features,’ and thus evidence of copying tends to show nonobviousness.” *WBIP*, 829 F.3d at 1336 (quoting *Crocs, Inc., v. Int’l Trade Comm’n*, 598 F.3d 1294, 1311 (Fed. Cir. 2010)). “Demonstrating that an invention has commercial value, that it is commercially successful, weighs in favor of its nonobviousness.” *Id.* at 1337.

¹⁹ In the Sur-reply, Patent Owner states that “[t]he inventive combination of propeller arrangement and steering axis location reduces steering torque, alters the center of pressure, and achieves greater maneuverability in a wider range of boat hull types—a combination of benefits not achieved by drives in the prior art and recognized throughout the industry praise.” PO Sur-reply 23. Even assuming this discussion as to nexus is timely, Patent Owner does not support this assertion with any evidence of record as to, for example, how one of ordinary skill in the art would have understood the disclosures discussed. *See, e.g.*, PO Sur-reply 24 (discussing, without evidence, how one of ordinary skill in the art would understand Exhibit 2008); *see also Elbit Sys. of Am., LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1359 (Fed. Cir. 2018) (rejecting attorney argument as to the alleged understanding of one of skill in the art on an issue when no evidence was presented).

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Patent Owner argues that Petitioner copied the Forward Drive for Petitioner's Bravo Four S product and asserts that sales of both the Forward Drive and Bravo Four S demonstrate commercial success. *See* PO Resp. 7–11, 53–59. We first address the alleged copying. Patent Owner argues that,

[REDACTED]

[REDACTED]

[REDACTED] and in August 2020 launched a stern drive with forward-facing propellers, the Bravo Four S, embodying claims of the '692 Patent.” *Id.* at 9 (citing Ex. 2039 at 3, 4; Ex. 2040 at 13; 3d Winkel Decl. ¶¶ 119–120). According to Patent Owner, “Petitioner did so in an attempt to capture a portion of the rapidly growing water sports market.” *Id.* at 10 (citing Ex. 2039 at 3–4). Patent Owner asserts that the similarities between the Forward Drive and Bravo Four S are “impossible to ignore” and were noticed by industry commentators. *Id.* at 10–11 (citing 3d Winkel Decl. ¶¶ 101–117; Ex. 2019; Ex. 2020).

We agree with Patent Owner that the record here shows some evidence supporting a finding of copying. “Evidence of copying may include internal documents, direct evidence such as photos of patented features or disassembly of products, or access and similarity to a patented product.” *See Liqwd, Inc. v. L’Oreal USA, Inc.*, 941 F.3d 1133, 1137 (Fed. Cir. 2019). We first address internal documents. As noted by Patent Owner, Petitioner identifies, in its own internal documents, the objective of an internal program as delivering a product—later named the Bravo Four S—

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] See PO Resp. 10–11

(stating that “Petitioner used the Volvo Penta Forward Drive as a benchmark throughout the entire development of Bravo Four S”); [REDACTED]

[REDACTED]

[REDACTED]

Petitioner does not directly address these internal documents in its Reply, but does argue that Patent Owner has not shown any nexus from the alleged copying to *specific claimed features*. See PO Resp. 21–22. In a paragraph cited by Petitioner, Mr. Poirier states that Petitioner “benchmarked Volvo’s [Forward Drive] as it does with all competitor

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marine propulsion systems (and as all major marine propulsion system manufacturers do)” and that Petitioner “had no desire and no need to look at the Volvo [Forward Drive] for any reason other than for benchmarking against [the] Bravo Four S drive.” Ex. 1025 ¶ 20, *cited at* Pet. Reply 21. Patent Owner responds that this process is more akin to “copying.” *See* PO Sur-reply 20–22. The record more strongly supports Patent Owner’s view.

When asked about the term “benchmarking,” Dr. Winkel stated that it is typically used in the industry as “gathering information about the design’s performance characteristics of your competitor products, and then comparing that to your own.” Ex. 1024, 21:10–23. According to Dr. Winkel, Petitioner used the Forward Drive differently—more for “templating”—in that Petitioner did not have a comparable product and wanted to create one with similar capabilities. *See id.* at 21:24–22:22. Aside from Dr. Winkel’s testimony comparing the “benchmarking” process as performed by Petitioner with how the term “benchmarking” is used by other entities, the record does not appear to include evidence on accepted practices for this issue. *Cable Elec. Prod., Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1028 (Fed. Cir. 1985) (“Even widespread copying could weigh toward opposite conclusions, depending on the attitudes existing toward patent property and *the accepted practices in the industry in question*. It is simplistic to assert that copying per se should bolster the validity of a patent.”), *overruled on other grounds by Midwest Indus., Inc. v. Karavan Trailers, Inc.*, 175 F.3d 1356 (Fed. Cir. 1999); Tr. 81:22–24 (counsel for Patent Owner stating that “there’s not evidence in the record that that specific process that they undertook is common in the industry”).

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The record supports that the “benchmarking” process by Petitioner was more akin to “copying” than to a mere assessment of a competitor’s products. [REDACTED]

[REDACTED] On the record here, this evidence aligns more closely to copying of the Forward Drive *overall* than merely generally assessing its performance and other characteristics for competitive purposes.

Petitioner takes the position that the Bravo Four S was not copied from the Forward Drive, but instead was a “natural evolution” of Petitioner’s own Bravo Three X. *See* Ex. 1025 ¶ 5, *cited at* Pet. Reply 22 (providing side-by-side comparison of the Bravo Four S and Bravo Three X). Even if, as asserted by Petitioner, the Bravo Four S reused 92% of the components of the Bravo Three X, with only a small percentage being completely new (Ex. 1025 ¶ 5), and even if the design of the Bravo Four S was “relatively quick” and “inexpensive,” [REDACTED]

[REDACTED]; *see also* PO Sur-reply 13 (“All of Petitioner’s actions were in reaction to Patent Owner’s patented invention” (citing Ex. 2056 at 10:19–22 (“[O]bviously we know that Volvo launched a forward-facing drive in the marketplace, so that kind of initiated obviously discussions around the forward-facing drive.”))). And again, assuming as we do in the context of this discussion that Patent Owner

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has shown a nexus from the claims of the '692 patent to the Forward Drive generally, we view that guidance as supporting a finding of copying the Forward Drive generally.

We turn now from internal documents to other categories of potential evidence of copying—alleged similarities between products. *See Liqwd*, 941 F.3d at 1137. Here, Patent Owner presents side-by-side photos of the Forward Drive and Bravo Four S and takes the position that the similarities are “impossible to ignore,” with Patent Owner relying on seventeen paragraphs of one of Dr. Winkel’s Declarations. PO Resp. 10 (citing 3d Winkel Decl. ¶¶ 101–117). Petitioner responds by highlighting differences as to the five features alleged by Dr. Winkel as common to both products.

As an initial matter, Patent Owner provides no analysis on the issue at all (PO Resp. 10–11), but instead improperly incorporates by reference fifteen pages of Dr. Winkel’s testimony. *See* 37 C.F.R. § 42.6(a)(3); *see also Cisco Sys., Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 at 8–10 (PTAB Aug. 29, 2014) (informative). Further, even assuming that the similarities highlighted by Dr. Winkel show copying rather than mere design consistencies based on the constraints facing *any* forward-facing stern drive, we are more persuaded by the evidence of copying of the Forward Drive from Petitioner’s own internal documents than by this side-by-side comparison. *See, e.g.*, Pet. Reply 24 (discussing how “Features (C) and (D) are a direct and natural consequence of a hydrodynamically-optimized gearcase”).

Patent Owner also relies on statements by industry commentators as to alleged similarities between the Forward Drive and the Bravo Four S as well

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as alleged similarities in the marketing between the products. *See* PO Resp. 11 (citing Exs. 2019 & 2020 as to industry commentators and Exs. 2005, 2008, 2020 and 2018 as to marketing). Again, we view this evidence as supporting, but less persuasive on the issue, than Petitioner’s own internal documents. Assuming for purposes of this discussion that nexus has been established to the Forward Drive generally, we view the evidence above as entitled to some weight of nonobviousness based on copying.

We turn now to commercial success. Patent Owner asserts that sales of both the Forward Drive and Petitioner’s Bravo Four S demonstrate commercial success attributable to the ’692 patent. *See* PO Resp. 7–9, 53–56. We view the record developed at trial as supporting a finding of at least some commercial success. Petitioner acknowledges, via Mr. Poirier, that, as argued by Patent Owner, the Forward Drive essentially created a new market for stern drives. *See* Ex. 1025 ¶ 5 (stating that “Volvo showed that a market for a stern drive with forward facing propellers was viable”), *cited at* PO Sur-reply 22; [REDACTED]

[REDACTED] *cited at* PO Sur-reply 22; *see also* Ex. 2029 ¶ 7 (“The Forward Drive opened up a new market for stern-drive powered boats, such as existing bow riders, to compete in the wake surfing market.” (citing Ex. 2045)), *cited at* PO Resp. 7. In addition, Petitioner acknowledged, in its own internal documents, [REDACTED]
[REDACTED], *cited at* PO Resp. 7, 54.

Although the record does not appear to include specific sales numbers,

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Petitioner does not contest Mr. Sweet’s statement that sales of the “Forward Drive have increased significantly since its launch in 2015.” Ex. 2029 ¶ 7, *cited at* PO Resp. 7, 53.

The record also shows, and Petitioner does not contest, that “more and more boat builders are offering the Volvo Penta Forward Drive as original equipment, including boats specifically designed to incorporate the Forward Drive.” PO Resp. 8 (citing Ex. 2029 ¶¶ 8, 9; Ex. 2039 at 3); *see id.* at 55 (noting the “number of stern drive boats featuring the Forward Drive increased by 148% between 2017 and 2019”). [REDACTED]

[REDACTED]

Petitioner argues that Patent Owner “has not met its burden in establishing that the alleged commercial success of the [Forward Drive] has nexus to the merits of the claimed invention, which is the offset steering axis” and argues that the evidence “shows that any commercial success is likely due to unclaimed features and/or prior art features (which are what Volvo relies on in marketing its drive).” Pet. Reply 20. As discussed above, we assume, for purposes of this discussion, that Patent Owner has shown a nexus from the claims of the ’692 patent to the Forward Drive generally, and are not persuaded by Petitioner’s argument that Patent Owner must show nexus to the “offset steering axis” feature.

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Petitioner also argues that the commercial success is due to marketing in that Patent Owner spent “50% of its marketing budget in the ‘Marine Leisure Gas Business Segment’ from 2015–2017 on the [Forward Drive] alone, despite [Patent Owner’s] many other products in the segment (e.g., Inboard shaft, Aquamatic sterndrive, Duoprop, IPS, Saildrive).” Pet. Reply 21 (citing Ex. 1021; Ex. 1022). As noted by Patent Owner, however, Petitioner focuses on the first three years *immediately after* introduction of the Forward Drive. See PO Sur-reply 22 (citing Ex. 1021; Ex. 1022). It stands to reason that a product that Petitioner admits opened up a new market for stern drives would require increased marketing to gain traction in the marketplace.

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[REDACTED] PO Sur-reply 23 n.3. Assuming for purposes of this discussion that nexus has been established to the Forward Drive product, we view the evidence above as entitled to some weight of nonobviousness based on commercial success.

(c) Industry Praise

Praise from industry participants, especially competitors, is probative of nonobviousness because such participants “are not likely to praise an obvious advance over the known art. Thus, if there is evidence of industry praise of the claimed invention in the record, it weighs in favor of the nonobviousness of the claimed invention.” *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1053 (Fed. Cir. 2016) (en banc).

Patent Owner argues that the Forward Drive has received significant industry praise. *See* PO Resp. 5–7, 59. Specifically, Patent Owner highlights that “the National Marine Manufacturers Association bestowed its Innovation Award for Alternate Drive Technology on the Forward Drive” at the 2015 Miami International Boat Show, where the Drive was introduced. *Id.* at 6 (citing Ex. 2029 ¶ 6; Ex. 2030; Ex. 2031; Ex. 2004; Ex. 2006).

Patent Owner also summarizes laudatory comments about the Forward Drive in several trade publications. *See* PO Resp. 5–7 (citing Exs. 2004–2012, 2031–2038; Ex. 2029 ¶ 6); *see also id.* at 59 (referring to same). Patent Owner then highlights internal Petitioner documents discussing the

[REDACTED]

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[REDACTED] *See* PO Resp. 59.

Petitioner responds that much of the evidence highlighted by Patent Owner focuses on either “unclaimed” or “old” features and does not focus

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on the alleged “merit of the claimed invention”—a steering axis forward of the vertical drive shaft (and underwater drive housing). *See* Pet. Reply 17–19. For the reasons discussed above, the objective evidence need not be limited to solely the allegedly novel aspect(s). As also discussed above, however, Patent Owner has not established nexus on the record here.

We do agree with Petitioner’s position, however, that many of the statements of alleged praise specifically discuss unclaimed features, such as adjustable trim and exhaust-related features. *See* Pet. Reply 18 (citing numerous exhibits of alleged praise that discuss these features). These exhibits do, however, provide praise for the Forward Drive more generally, including mentioning its forward-facing propellers, as claimed in the ’692 patent. Again, assuming for purposes of this discussion that nexus has been established to the Forward Drive generally, we view the laudatory praise of that product in trade publications as entitled to some, but not considerable, weight of nonobviousness. *See Henny Penny*, 938 F.3d at 1333–34 (“We thus conclude that substantial evidence supports the Board’s findings with respect to the objective evidence and that the Board did not err in giving some weight to the industry praise of Frymaster’s deep fryer product.”); Exs. 2004–2012, 2031–2038.

We turn now to the Innovation Award at the 2015 Miami International Boat Show. Again, Petitioner argues that the Award does not focus on the alleged merit of the claimed invention—a steering axis forward of the vertical drive shaft (and underwater drive housing). *See* Pet. Reply 19–20. For the reasons discussed above, the objective evidence need not be limited to solely the allegedly novel aspect(s).

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We agree with Petitioner, however, that many statements in the award submission documents discuss unclaimed features, such as adjustable trim. *See* Pet. Reply 19–20 (citing Ex. 1015, 1016, 1019). The Award, however, was presented for the Forward Drive generally. *See* Exs. 2030 & 2031. Again, assuming for purposes of this discussion that nexus has been established to the Forward Drive generally, we view the Innovation Award as entitled to some, but not considerable, weight of nonobviousness.

Lastly, we turn to the internal Petitioner documents. Petitioner does not address the cited exhibits (Exhibits 2039 and 2042) in the Reply. *See* Pet. 17–20. Internal documents from a competitor can provide evidence of industry praise. *See, e.g., Apple*, 839 F.3d at 1053. Here, again assuming for purposes of this discussion that nexus has been established to the Forward Drive generally, we view the cited statements in Petitioner’s internal documents as entitled to some, but not considerable, weight of nonobviousness. [REDACTED]

[REDACTED] For these reasons, assuming that nexus has been established to the Forward Drive generally, we view the evidence of industry praise as collectively entitled to some weight of nonobviousness.

(d) Skepticism

“Evidence of industry skepticism weighs in favor of non-obviousness. If industry participants or skilled artisans are skeptical about whether or how a problem could be solved or the workability of the claimed solution, it favors non-obviousness.” *WBIP, LLC*, 829 F.3d at 1335. Patent Owner argues that “[t]he success and growth in popularity of the Forward Drive continued even when faced with skepticism and disparagement in the

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marketplace.” PO Resp. 60 (citing Ex. 2008 at 3). In support, Patent Owner first highlights statements from Petitioner allegedly “disparaging forward-facing propellers” and then relies on a website in which Petitioner allegedly “promotes its propulsion systems having rear-facing propellers as ‘safer by design.’” *Id.* (citing Ex. 2014).

This evidence does not show skepticism “about whether or how a problem could be solved or the workability of the claimed solution” (*WBIP, LLC*, 829 F.3d at 1335); instead, it generally discusses advantages and disadvantages present in systems with forward-facing or rear-facing propellers. Moreover, viewed in context, the bottom portion of page 2 of Exhibit 2014, quoted by Patent Owner, does not indicate even a *preference* for one configuration over the other, stating that *both* configurations “have delivered impressive performance” and that *both* configurations “hav[e] nearly identical efficiency.” Ex. 2014 at 2.

Second, Patent Owner argues that, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] PO Resp. 60 (citing Ex. 2043 at 5–6; 3d Winkel Decl. ¶ 112); *see also id.* at 62 (further discussing Petitioner’s alleged “use of the Forward Drive as a ‘benchmark’”).

Again, this evidence does not show skepticism, such as doubt or disbelief about likely success of the solution (*WBIP, LLC*, 829 F.3d at

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1335); instead, it merely shows how the Forward Drive solves certain engineering issues, such as those related to cooling and exhaust. We afford objective evidence of this indicium very little weight.

(e) Long-felt but Unsolved Need

Evidence of a long-felt but unsolved need tends to show nonobviousness because it is reasonable to infer that the need would have not persisted had the solution been obvious; however, “[a]bsent a showing of long-felt need or the failure of others, the mere passage of time without the claimed invention is not evidence of nonobviousness.” *See Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004).

Patent Owner contends that its Forward Drive “satisfied a long-felt, unmet need in the industry for a better watersports platform.” PO Resp. 7. In support, Patent Owner states, “in some places, watersports, such as wakesurfing, were not legal unless a propeller was far enough under a boat hull or a platform.” *Id.* (citing Ex. 2008 at 2). According to Patent Owner, “the industry needed a solution, particularly in light of the growing popularity of this emerging water sport” and the “Forward Drive provided a solution.” *Id.* at 7–8.

The cited page from Exhibit 2008 indicates that the Forward Drive started a “revolution” in wakesurfing, but does not provide objective evidence that the industry saw a “better watersports platform” as a persistent need that others tried, and failed, to solve. *See In re Gershon*, 372 F.2d 535, 538 (CCPA 1967); *see also Vandenberg v. Dairy Equip. Co.*, 740 F.2d 1560, 1567 (Fed. Cir. 1984) (finding of lack of long-felt need not clearly erroneous when there was “no showing that the industry was very concerned with the problem involved”). Moreover, establishing long-felt need requires

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objective evidence that the invention at issue satisfies the long-felt need. *In re Cavanagh*, 436 F.2d 491, 496 (CCPA 1971). Here, Exhibit 2008 credits Bryant Boat's SportPorch extended platform extension, at least in part, for putting the propeller far enough under the platform to make the overall system legal for wakesurfing. Ex. 2008 at 2.

Patent Owner also highlights two sentences in Exhibit 1013, which Patent Owner asserts "demonstrate[] that a need existed to satisfy or appeal to the water sports market, but as Petitioner admits, the market for a forward-facing stern drive capable of satisfying that need was created by Patent Owner." PO Sur-reply 25 (citing Ex. 1013 at 33 ("For the past decade, growth in the US leisure motorboat market has been dominated by pricey inboard tow-boats and ski boats specialised for watersports. A forward-facing sterndrive allows Volvo Penta to compete in the water sports market, while offering a versatile boat that is attractive to a broad range of customers.")). Again, the cited evidence discusses alleged benefits of the Forward Drive compared to the prior art, but does not show that the industry saw a better watersports platform as a persistent need *that others failed to solve*. See *Gershon*, 372 F.2d at 538; *Vandenberg*, 740 F.2d at 1567. We afford objective evidence of this indicium very little weight.

(f) Alleged Failure of Others

Consideration of objective evidence of nonobviousness also includes "the failure of others to produce alternatives to the patented invention." *GPAC Inc.*, 57 F.3d at 1580. Patent Owner argues that the length of time from the issuance of the Brandt and Kiekhaefer references to the filing of the application that led to the '692 patent indicates nonobviousness. See PO Resp. 62 ("Petitioner filed the Kiekhaefer patent application in 1949. The

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Brandt reference issued forty years later, in 1989. Twenty-five years later, the '692 Patent was filed.” (citations omitted)). According to Patent Owner, “[i]n all those years, and in spite of being an active competitor in the stern-drive market, Petitioner never recognized the need for a forward-facing stern drive.” *Id.*

Patent Owner cites *Leo Pharmaceutical Products, Ltd. v. Rea*, but that decision dealt with the passage of time in the context of analyzing long-felt but unresolved need (which Patent Owner has not established, as discussed above); it does not support the proposition that the *mere passage of time* from the dates of the prior art to the challenged patent indicate nonobviousness. *See Leo Pharm. Prods.*, 726 F.3d 1346, 1359 (Fed. Cir. 2013) (“The record also shows evidence of *long* felt but unsolved need, *i.e.*, the need for a single formulation to treat psoriasis. The length of the intervening time between the publication dates of the prior art and the claimed invention can also qualify as an objective indicator of nonobviousness.”); *see also Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1337–38 (Fed. Cir. 2016) (distinguishing *Leo Pharmaceutical* for similar reasons), *overruled on other grounds by Aqua Prod., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017).

In addition, Patent Owner argues that “Petitioner waited until several years after Volvo Penta launched the commercial embodiments of the '692 Patent [REDACTED].” PO Resp. 63. The fact that Petitioner waited until after introduction of the Forward Drive to enter the market does not show that any “inability or unwillingness of competitors” to develop alternative products “is rooted in

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the subject matter” of the challenged claims (*GPAC Inc.*, 57 F.3d at 1580) rather than *other* factors, such as, for example, lack of market demand. We afford objective evidence of this indicium very little weight.

(9) Conclusion

For the reasons discussed above (§ II.E.2.a.1–7), the evidence presented by Petitioner strongly indicates that claim 1 would have been obvious over the combination of Brandt and Kiekhaefer. For the reasons also discussed above (§ II.E.2.a.8), Patent Owner has not demonstrated a nexus; if we were to assume a nexus, Patent Owner’s objective evidence weighs somewhat in favor of nonobviousness. When considering all the evidence of obviousness and nonobviousness together (*see In re Cyclobenzaprine*, 676 F.3d at 1079), we find Petitioner’s strong evidence of obviousness outweighs Patent Owner’s objective evidence of nonobviousness. Thus, we conclude Petitioner has demonstrated by a preponderance of the evidence that claim 1 would have been obvious over Brandt and Kiekhaefer.

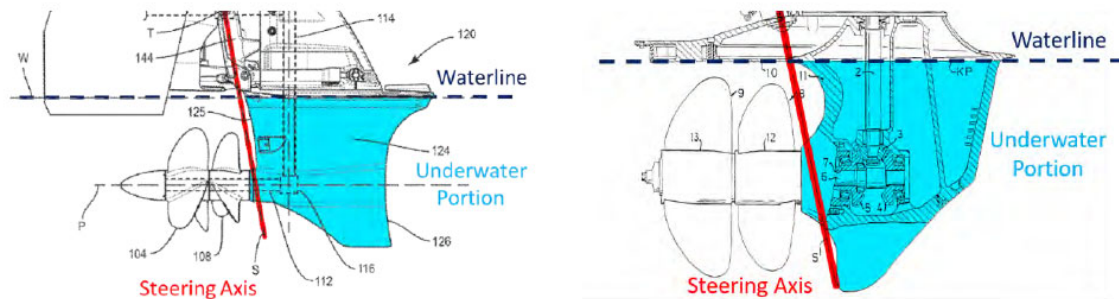
b. Dependent Claim 2

Claim 2 depends from claim 1 and adds “wherein the drive housing includes an underwater portion configured to be below the waterline of the boat, wherein the underwater portion is almost entirely rearward of the steering axis.” Ex. 1001, 5:59–62. Petitioner provides the following side-by-side comparison of a modified version of Figure 3 from the ’692 patent (left-side figure) with a portion of an additional modified version of Figure 1 of Brandt (which generally depicts the proposed modified device) (right-side figure):

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Pet. 63. Prior to modification, Figure 3 of the '692 patent depicts a tractor-type drive for a boat (Ex. 1001, 2:34–34, 3:10–11) whereas Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit” (Ex. 1005, 2:55–56). In the modified version of Figure 1 of the '692 patent, Petitioner has (1) added a horizontal dotted line and text box for the “Waterline,” (2) added a text box and light blue highlighting for an “Underwater Portion,” and (3) added a text box and red line for a “Steering Axis.” Pet. 63. In the modified version of a portion of Figure 1 of Brandt, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added a horizontal dotted line and text box for the “Waterline,” (4) added a text box and light blue highlighting for an “Underwater Portion,” and (5) added a text box and red line for a “Steering Axis.” *Id.*

Citing passages from Brandt, Petitioner states that one of ordinary skill in the art would have understood “that the waterline is located at the line depicted as Kp of the Brandt drive” and that, in view of these teachings, one of ordinary skill in the art would have understood “that the Brandt–Kiekhäfer combination (pictured on right, [above]) would have retained Brandt’s drive housing with an underwater portion configured to be below the waterline of the boat,” as shown in light blue. Pet. 62 (citing Schofield

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Pet. Decl. ¶¶ 146–147; Ex. 1005, 3:14–17). In addition, citing to the section of the Petition discussing the alleged reasons to modify Brandt based on Kiekhaefer, Petitioner states that it “would have been obvious to [one of ordinary skill in the art] to modify Brandt’s drive (including its steering axis) such that the combination would have a tractor-type propeller as taught by Kiekhaefer” and that “[t]his is shown [above] for the combination (on right), which has an underwater portion that is almost entirely rearward of the steering axis, just like the ’692 patent (on left).” Pet. 63. Then, citing to the section of the Petition discussing element 8[g], Petitioner states that “in order to counteract a steering torque about the steering axis generated by the propellers during a turn, it would have been obvious for [one of ordinary skill in the art] to position the underwater housing (and its center-of-pressure) rearward of the steering axis.” Pet. 64 (citing Schofield Pet. Decl. ¶¶ 111–122, 148–149, 172–181).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 2 would have been obvious based on Brandt and Kiekhaefer.

c. Dependent Claim 3

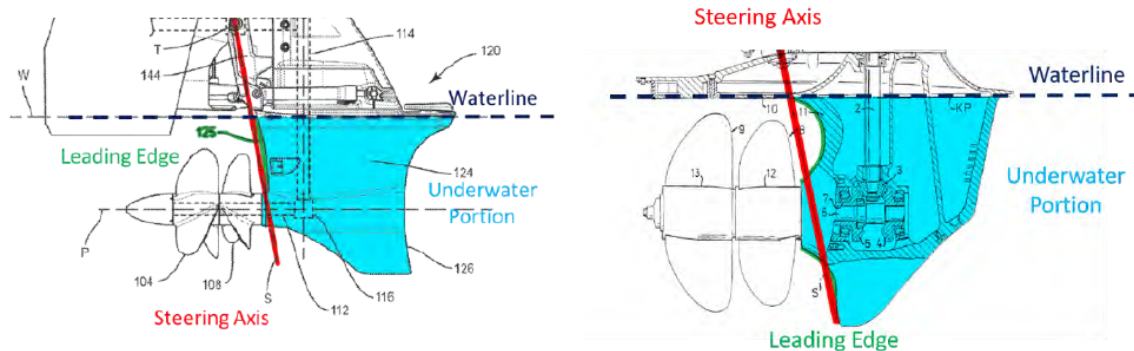
Claim 3 depends from claim 1 and adds “wherein the drive housing includes an underwater portion configured to be below the waterline of the boat, wherein the underwater portion has a leading edge, wherein a majority of the leading edge is rearward of the steering axis.” Ex. 1001, 5:63–67.

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Petitioner provides the following side-by-side comparison of a modified version of Figure 3 from the '692 patent (left-side figure) with a portion of an additional modified version of Figure 1 of Brandt (which generally depicts the proposed modified device) (right-side figure):



Pet. 66. Prior to modification, Figure 3 of the '692 patent depicts a tractor-type drive for a boat (Ex. 1001, 2:34–34, 3:10–11) whereas Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit” (Ex. 1005, 2:55–56). In the modified version of Figure 1 of the '692 patent, Petitioner has (1) added a horizontal dotted line and text box for the “Waterline,” (2) added a text box and light blue highlighting for an “Underwater Portion,” (3) added a text box and red line for a “Steering Axis,” and (4) added a text box and green line for a “Leading Edge.”

Pet. 66. In the modified version of a portion of Figure 1 of Brandt, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added a horizontal dotted line and text box for the “Waterline,” (4) added a text box and light blue highlighting for an “Underwater Portion,” (5) added a text box and red line for a “Steering Axis,” and (6) added a text box and green line for a “Leading Edge.” *Id.*

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Petitioner refers to the discussion of claim 2 as to the “underwater portion” of the housing. Pet. 64–65 (citing Schofield Pet. Decl. ¶ 151). Then citing to the section of the Petition discussing the alleged reasons to modify Brandt based on Kiekhaefer, Petitioner states that it “would have been obvious to [one of ordinary skill in the art] to utilize the drive disclosed in Brandt, including its steering axis, in a tractor mode for advantageous reasons explained by Kiekhaefer” and that “[t]his is depicted for the Brandt–Kiekhaefer combination (pictured on right, [above]), which has an underwater portion (blue) with a majority (i.e., most) of the leading edge (green) rearward of the steering axis (red).” Pet. 65. Then, citing to the section of the Petition discussing element 8[g], Petitioner states that “in order to counteract a steering torque about the steering axis generated by the propellers during a turn, it would have been obvious for [one of ordinary skill in the art] to position the underwater housing (including its **leading edge**) rearward of the steering axis.” Pet. 66 (citing Schofield Pet. Decl. ¶¶ 152–153, 172–181).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 3 would have been obvious based on Brandt and Kiekhaefer.

d. Dependent Claim 4

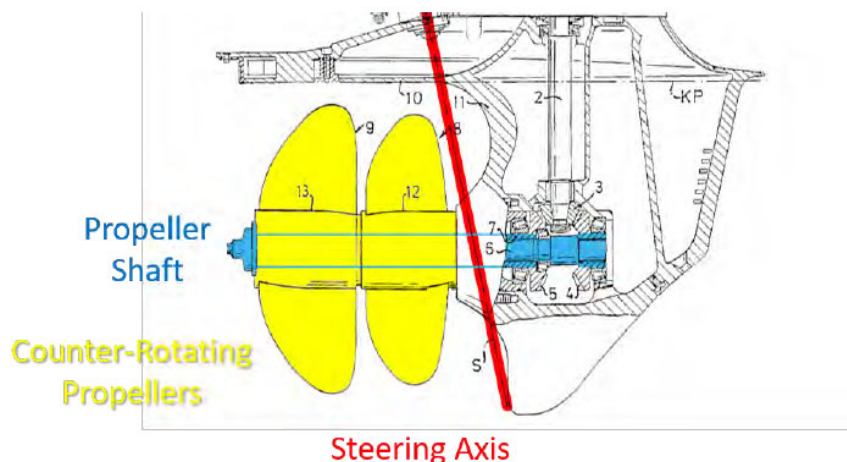
Claim 4 depends from claim 1 and adds “wherein two counter-rotating propellers are mounted on the propeller shaft and wherein the steering axis is

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rearward of at least a forward propeller at a location where the steering axis intersects a propeller axis.” Ex. 1001, 6:1–5. Petitioner provides the following version of a portion of an additional modified version of Figure 1 of Brandt, which generally depicts the proposed modified device:



Pet. 69. Prior to modification, Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit.” Ex. 1005, 2:55–56. In the modified version, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added a text box and blue highlighting for “Propeller Shaft,” (4) added a text box and yellow highlighting for “Counter-Rotating Propellers,” and (5) added a text box and red line for a “Steering Axis.” Pet. 69.

Petitioner first cites disclosures in Brandt as to counter-rotating propellers and states that the combination of Brandt and Kiekhaefer

discloses two counter-rotating propellers mounted on the propeller shaft, which counter-rotating propellers would have been in the combined system or the combined system could have used two of Kiekhaefer’s pulling propellers or any other pulling propellers well known to [one of ordinary skill in the art] at the time (such as the ones described in Stechauner).

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Pet. 67 (citing Ex. 1005, 1:8–11, 3:2–3; Schofield Pet. Decl. ¶ 155).²⁰

Then, citing to the section of the Petition discussing the alleged reasons to modify Brandt based on Kiekhaefer, Petitioner states that one of ordinary skill in the art “would have been motivated to reverse Brandt’s lower drive unit and use a pulling-type/tractor-type propeller as taught by Kiekhaefer” and that “[s]uch a modification . . . has a drive housing that ‘is mostly rearward of the steering axis’ in order to accommodate the pulling-type/tractor-type propellers.” Pet. 68 (citing Schofield Pet. Decl. ¶¶ 172–181). Petitioner states that the modified Figure above “has a steering axis (red) that is rearward of at least a forward propeller (yellow) at a location where the steering axis intersects a propeller axis (blue).” *Id.* (citing Schofield Pet. Decl. ¶¶ 156–157).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 4 would have been obvious based on Brandt and Kiekhaefer.

e. Dependent Claim 5

Claim 5 depends from claim 1 and adds “wherein the steering axis is angled with respect to the drive shaft so that the steering axis intersects with a vertical drive shaft axis at a location below the waterline of the boat.”

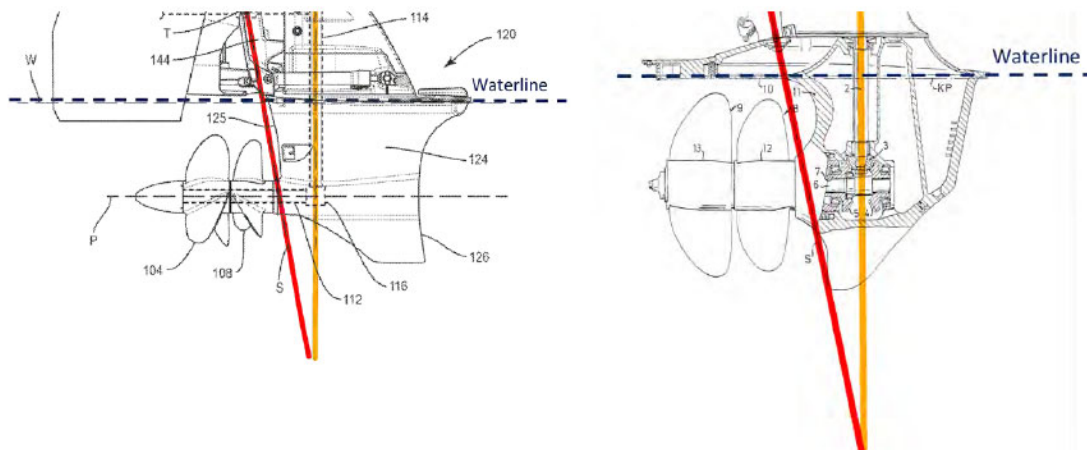
²⁰ Petitioner interprets “propeller shaft” as “one or more propeller shafts.” Pet. 67 n.8.

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Ex. 1001, 6:6–9. Petitioner provides the following side-by-side comparison of a modified version of Figure 3 from the '692 patent (left-side figure) with a portion of an additional modified version of Figure 1 of Brandt (which generally depicts the proposed modified device) (right-side figure):



Pet. 70. Prior to modification, Figure 3 of the '692 patent depicts a tractor-type drive for a boat (Ex. 1001, 2:34–34, 3:10–11) whereas Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit” (Ex. 1005, 2:55–56). In the modified version of Figure 1 of the '692 patent, Petitioner has (1) added a horizontal dotted line and text box for the “Waterline,” (2) added a red line for the steering axis, and (3) added an orange line for the vertical drive shaft axis. Pet. 70. In the modified version of a portion of Figure 1 of Brandt, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added a horizontal dotted line and text box for the “Waterline,” (4) added a red line for the steering axis, and (5) added an orange line for the vertical drive shaft axis. *Id.*

After citing the portion of the Petition providing the reasons to combine Brandt with Kiekhaefer, Petitioner states that the drive of the

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proposed combination, shown on the right above, “has a steering axis (red) that is angled with respect to the drive shaft so that the steering axis intersects a vertical drive shaft axis (orange) at a location below the waterline (blue line below) of the boat.” Pet. 69–70 (citing Schofield Pet. Decl. ¶¶ 158–160).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 5 would have been obvious based on Brandt and Kiekhaefer.

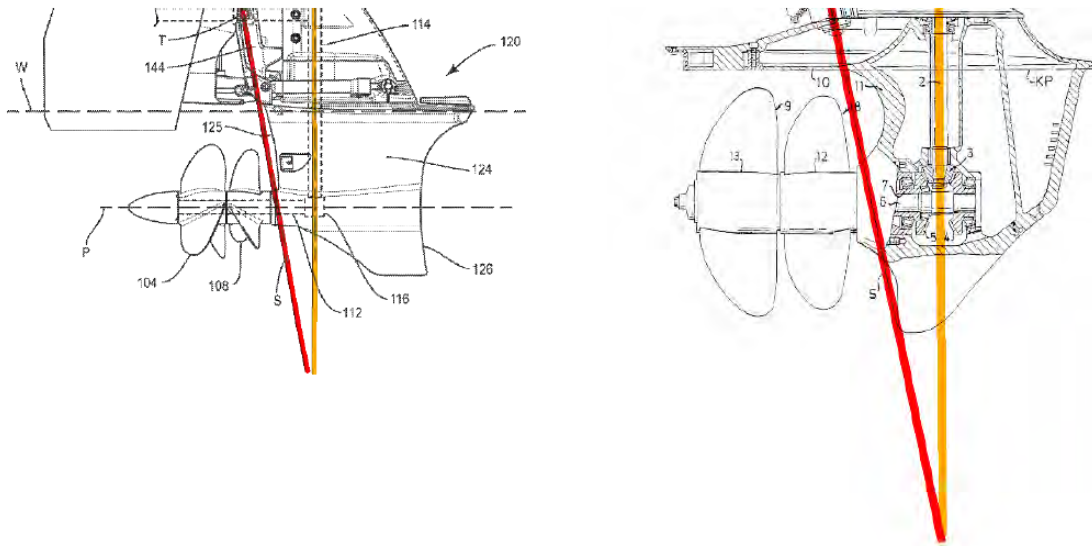
f. Dependent Claim 6

Claim 6 depends from claim 1 and adds “wherein the steering axis intersects the vertical drive shaft axis at a location below the drive housing.” Ex. 1001, 6:10–12. Petitioner provides the following side-by-side comparison of a modified version of Figure 3 from the ’692 patent (left-side figure) with a portion of an additional modified version of Figure 1 of Brandt (which generally depicts the proposed modified device) (right-side figure):

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Pet. 71. Prior to modification, Figure 3 of the '692 patent depicts a tractor-type drive for a boat (Ex. 1001, 2:34–34, 3:10–11) whereas Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit” (Ex. 1005, 2:55–56). In the modified version of Figure 1 of the '692 patent, Petitioner has (1) added a red line for the steering axis and (2) added an orange line for the vertical drive shaft axis. Pet. 71. In the modified version of a portion of Figure 1 of Brandt, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added a red line for the steering axis, and (4) added an orange line for the vertical drive shaft axis. *Id.*

Petitioner states that, “[i]n addition to disclosing that the steering and drive shaft axes intersect below the waterline (explained for claim 5 above), Brandt-Kiekhaefer combination also discloses this intersection is below the drive housing (pictured on right, [above]).” Pet. 71 (citing Schofield Pet. Decl. ¶¶ 161–162).

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We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 6 would have been obvious based on Brandt and Kiekhaefer.

g. Dependent Claim 7

Claim 7 depends from claim 1 and adds “comprising a pair of coaxial, counter-rotating pulling propellers.” Ex. 1001, 6:13–14. Petitioner cites disclosures in Brandt as to counter-rotating propellers and then states that the combination of Brandt and Kiekhaefer render obvious the additional limitation in claim 7 for the same reasons as discussed above as to claim 4. Pet. 72 (citing Ex. 1005, 1:8–11, 3:2–3; Schofield Pet. Decl. ¶ 163).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 7 would have been obvious based on Brandt and Kiekhaefer.

h. Independent Claim 8

Petitioner contends that Brandt, modified based on Kiekhaefer, satisfies each of the limitations of claim 8. Pet. 46–53, 72–79. Petitioner identifies certain passages in the cited references and explains the significance of each passage with respect to the corresponding claim

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limitation. *Id.* Petitioner also articulates reasons to modify Brandt based on Kiekhaefer and argues that there would have been a reasonable expectation of success. Pet. 46–53. We address in turn below the subject matter of each limitation in claim 8, then Petitioner’s identified reasons to modify Brandt based on Kiekhaefer, and then objective evidence of nonobviousness.

(1) Elements 8[p] through 8[f]

For elements 8[p] through 8[f], Petitioner refers to the discussions for (1) element 1[p], (2) elements 1[b] and 1[d], (3) elements 1[a], 2[a], and 3[a], (4) element 1[b], (5) element 2[b], (6) elements 1[c] and 1[d], and (7) claim 6, respectively. Pet. 72–76 (citing Schofield Pet. Decl. ¶¶ 164–171). Patent Owner does not present separate arguments for these elements. For the same reasons discussed above as to the parallel elements, we find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the asserted prior art of Brandt and Kiekhaefer, as applied, satisfies each of elements 8[p] through 8[f].

(2) Element 8[g]

In element 8[g], claim 8 recites “wherein the drive housing and the drive housing support are configured such that a center of pressure applied by water moving past the drive housing during a turn is located rearward of the steering axis.” Ex. 1001, 6:31–35. Petitioner highlights the passages in the ’692 patent discussing the location of the center of pressure, including one that provides that “when the underwater portion of the drive housing “is mostly rearward of the steering axis . . . the center of pressure of the water flow upon the drive housing 120 **will necessarily be rearward of the steering axis.**” Pet. 77 (quoting, with emphasis added, Ex.1001, 4:49–53)

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(citing Ex. 1001, 4:45–48; *Koninklijke Philips v. Google*, 948 F.3d 1330, 1337–38 (Fed. Cir. 2020)).

Citing to the section of the Petition discussing the alleged reasons to modify Brandt based on Kiekhaefer, Petitioner states that it would have been obvious to one of ordinary skill in the art “to utilize the drive disclosed in Brandt, including its steering axis, with a pulling-type/tractor-type propeller as taught by Kiekhaefer” and that one of ordinary skill in the art “would have been motivated to reverse Brandt’s lower drive unit and use a pulling-type/tractor-type propeller as taught by Kiekhaefer.” Pet. 77–78. Petitioner adds that the modification “has an underwater portion of the drive housing that ‘is mostly rearward of the steering axis’ in order to accommodate the pulling-type/tractor-type propellers” and that one of ordinary skill in the art “would have understood that such a drive housing arrangement will have a ‘center of pressure of the water flow upon the drive housing [that] will necessarily be rearward of the steering axis.’” Pet. 78 (citing Ex. 1001, 4:49–53; Schofield Pet. Decl. ¶¶ 88–90, 111–122, 172–181).

We first address a claim construction issue. Petitioner argues in the Petition that “center of pressure applied by water moving past the drive housing during a turn” means “the point where the net force of the water flow acts on the underwater portion.” Pet. 8–9 (citing Schofield Pet. Decl. ¶¶ 26–28). Patent Owner states that “Petitioner offers an obviously erroneous claim construction to the Board” for this phrase but then agrees with all of Petitioner’s construction, but adds to the end the phrase “of the drive housing during a turn.” PO Resp. 19–20. According to Patent Owner, its proposed construction “includes the express terms of the claim phrase

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that Petitioner omits.” *Id.* at 20. In the Reply, Petitioner accepts Patent Owner’s construction and states it “has no bearing on any of the obviousness grounds.” Pet. Reply 5. As the parties appear to agree, Patent Owner’s proposed construction does not change Petitioner’s proposed construction, but merely adds text implied by the ’692 patent. *See* Ex. 1001, 4:41–48. We apply the agreed-upon understanding of this claim language below.

For the reasons stated by Petitioner and summarized above, we find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the feature required by this claim element would inherently (i.e., necessarily) be present in the proposed combination. *See Southwire Co. v. Cerro Wire LLC*, 870 F.3d 1306, 1311 (Fed. Cir. 2017) (“[W]e have emphasized that ‘the limitation at issue *necessarily* must be present’ in order to be inherently disclosed by the reference.” (quoting *PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1194–95 (Fed. Cir. 2014))).

Further, for the reasons below, we do not view Petitioner’s citation to the ’692 patent in the discussion of this element as improper reliance on applicant-admitted prior art (or “AAPA”). As an initial matter, we note that Patent Owner does not challenge Petitioner’s reliance on the statements in the ’692 patent as to this issue. We now turn to the analysis.

Before the filing of the Petition, the Director of the United States Patent and Trademark Office issued a memorandum setting forth binding guidance on how the Board shall consider statements by a patent applicant in a patent specification regarding the prior art when those statements are relied on in support of a request for *inter partes* review. *See* Memorandum from

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Andrei Iancu to Members of the Patent Trial and Appeal Board (Aug. 18, 2020), https://www.uspto.gov/sites/default/files/documents/signed_aapa_guidance_memo.pdf (“AAPA Guidance”).

Petitioner did not expressly list the potential AAPA as part of this asserted ground. *See, e.g.*, Pet. 2–3. Moreover, Petitioner relies on the potential AAPA only as *additional support* to its primary position that one of ordinary skill in the art would have understood that the “center of pressure” limitations are inherently present in the proposed combination of Brandt and Kiekhaefer. *See* Pet. 77–79 (citing Schofield Pet. Decl. ¶¶ 88–90, 111–122, 172–181). With this understanding, we view the following passage from the AAPA Guidance as aligning with Petitioner’s reliance on the alleged AAPA here:

Statements in a challenged patent’s specification may be used, however, when they evidence the general knowledge possessed by someone of ordinary skill in the art. That evidence, if used in conjunction with one or more prior art patents or printed publications forming “the basis” of the proceeding under § 311, can support an obviousness argument.

AAPA Guidance 4; *see also Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1376 (Fed. Cir. 2022) (stating that “even though evidence such as expert testimony and party admissions are not themselves prior art references, they are permissible evidence in an *inter partes* review for establishing the background knowledge possessed by a person of ordinary skill in the art”). Patent Owner does not present arguments for this limitation. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the proposed combination discloses this element.

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(3) The Modification of Brandt Based on Kiekhaefer

For claim 8, Petitioner relies on the same reasons to combine Brandt and Kiekhaefer, as well as the same reasonable expectation of success, as discussed above (*see* § II.E.2.a.7). *See* Pet. 46–53. Patent Owner does not provide arguments addressing the reasons to combine in the context of claim 8 for this asserted ground separate from those presented above as to claim 1. *See* § II.E.2.a.7. Accordingly, for the reasons above in the context of claim 1, we determine, in light of the complete record and in the context of claim 8 as to this asserted ground, that Petitioner has shown by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have had reason to combine Brandt and Kiekhaefer, as proposed, and would have had a reasonable expectation of success.

(4) Objective Indicia of Nonobviousness

The analysis of Patent Owner’s objective evidence of nonobviousness is the same for claim 8 in the context of this asserted ground as for claim 1. *See supra* § II.E.2.a.8.

(5) Conclusion

For the reasons discussed above (§ II.E.2.h.1–3), the evidence presented by Petitioner strongly indicates that claim 8 would have been obvious over the combination of Brandt and Kiekhaefer. For the same reasons discussed above (§ II.E.2.a.8), Patent Owner has not demonstrated a nexus; if we were to assume a nexus, Patent Owner’s objective evidence weighs somewhat in favor of nonobviousness. When considering all of the evidence of obviousness and nonobviousness together (*see In re Cyclobenzaprine*, 676 F.3d at 1079), we find Petitioner’s strong evidence of

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obviousness outweighs Patent Owner's objective evidence of nonobviousness. Thus, we conclude Petitioner has demonstrated by a preponderance of the evidence that claim 8 would have been obvious over Brandt and Kiekhaefer.

i. Dependent Claim 9

Claim 9 depends from claim 8 and adds "wherein the entire drive housing pivots about the steering axis relative to the drive housing support to steer the boat." Ex. 1001, 6:36–38. For this claim, Petitioner relies on the discussion as to element 1[b] and states that "Brandt also teaches that it is the entire drive housing that pivots about the steering axis relative to the drive housing support to steer the boat." Pet. 79 (citing Ex. 1005, 3:6–8; Schofield Pet. Decl. ¶ 183).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 9 would have been obvious based on Brandt and Kiekhaefer.

j. Dependent Claim 10

Claim 10 depends from claim 8 and adds "wherein the steering axis is at least partially rearward of the at least one front-facing propeller at a location where the steering axis intersects a propeller axis." Ex. 1001, 6:39–42. For this claim, Petitioner relies on the discussion as to claim 4 and states that "the Brandt-Kiekhaefer combination discloses the steering axis is rearward (and, therefore, also partially rearward) of the at least one front-

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facing propeller at a location where the steering axis intersects a propeller axis.” Pet. 80 (citing Schofield Pet. Decl. ¶ 184).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 10 would have been obvious based on Brandt and Kiekhaefer.

k. Independent Claim 11

Petitioner contends that Brandt, modified based on Kiekhaefer, satisfies each of the limitations of claim 8. Pet. 46–53, 80–84. Petitioner identifies certain passages in the cited references and explains the significance of each passage with respect to the corresponding claim limitation. *Id.* Petitioner also articulates reasons to modify Brandt based on Kiekhaefer and argues that there would have been a reasonable expectation of success. Pet. 46–53. We address in turn below the subject matter of each limitation in claim 11, then Petitioner’s identified reasons to modify Brandt based on Kiekhaefer, and then objective evidence of nonobviousness.

(1) Elements 11[p] thorough 11[g]

For elements 11[p] through 11[g], Petitioner refers to the discussions for (1) element 1[p], (2) elements 1[p] and 1[a], (3) elements 1[b] and 1[d], (4) elements 1[a] and 1[b], (5) element 1[b], (6) element 4[b], (7) element 4[b], and (8) element 8[g], respectively. Pet. 80–84 (citing Schofield Pet. Decl. ¶¶ 185–192). Patent Owner does not present separate arguments for these elements. For the same reasons discussed above as to the parallel

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elements, we find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the asserted prior art of Brandt and Kiekhäfer, as applied, satisfies each of elements 11[p] through 11[g].

(2) The Modification of Brandt Based on Kiekhäfer

For claim 11, Petitioner relies on the same reasons to combine Brandt and Kiekhäfer, as well as the same reasonable expectation of success, as discussed above (*see* § II.E.2.a.7). *See* Pet. 46–53. Patent Owner does not provide arguments addressing the reasons to combine in the context of claim 11 for this asserted ground separate from those presented above as to claim 1. *See* § II.E.2.a.7. Accordingly, for the reasons above in the context of claim 1, we determine, in light of the complete record and in the context of claim 11 as to this asserted ground, that Petitioner has shown by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have had reason to combine Brandt and Kiekhäfer, as proposed, and would have had a reasonable expectation of success.

(3) Objective Indicia of Nonobviousness

The analysis of Patent Owner’s objective evidence of nonobviousness is the same for claim 11 in the context of this asserted ground as for claim 1. *See supra* § II.E.2.a.8.

(4) Conclusion

For the reasons discussed above (§ II.E.2.k.1–3), the evidence presented by Petitioner strongly indicates that claim 11 would have been obvious over the combination of Brandt and Kiekhäfer. For the same reasons discussed above (§ II.E.2.a.8), Patent Owner has not demonstrated a

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nexus; if we were to assume a nexus, Patent Owner’s objective evidence weighs somewhat in favor of nonobviousness. When considering all of the evidence of obviousness and nonobviousness together (*see In re Cyclobenzaprine*, 676 F.3d at 1079), we find Petitioner’s strong evidence of obviousness outweighs Patent Owner’s objective evidence of nonobviousness. Thus, we conclude Petitioner has demonstrated by a preponderance of the evidence that claim 11 would have been obvious over Brandt and Kiekhaefer.

l. Dependent Claim 12

Claim 12 depends from claim 11 and adds “wherein the drive housing includes an underwater portion configured to be below the waterline of the boat, wherein the underwater portion is almost entirely rearward of the steering axis.” Ex. 1001, 6:59–62. For this claim, Petitioner relies on the discussion as to elements 2[a], 3[a], and 2[b]. Pet. 84–85 (citing Schofield Pet. Decl. ¶¶ 193–194).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 12 would have been obvious based on Brandt and Kiekhaefer.

m. Dependent Claim 13

Claim 13 depends from claim 11 and adds “wherein the at least one pulling-type propeller is carried on a propeller shaft rotated by a drive shaft perpendicular to the propeller shaft axis, and wherein the steering axis is

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offset forward of the drive shaft.” Ex. 1001, 6:63–67. For this claim, Petitioner relies on the discussion as to elements 1[c] and 1[e]. Pet. 85–86 (citing Schofield Pet. Decl. ¶¶ 195–196).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 13 would have been obvious based on Brandt and Kiekhaefer.

n. Dependent Claim 14

Claim 14 depends from claim 11 and adds “wherein the steering axis intersects a drive shaft axis at a location below the drive housing.” Ex. 1001, 7:1–3. For this claim, Petitioner relies on the discussion as to claim 6 and element 8[f]. Pet. 86 (citing Schofield Pet. Decl. ¶ 197).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 14 would have been obvious based on Brandt and Kiekhaefer.

o. Dependent Claim 15

Claim 15 depends from claim 11 and adds “wherein the entire drive housing pivots about the steering axis relative to the drive housing support to

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steer the boat.” Ex. 1001, 7:4–6. For this claim, Petitioner relies on the discussion as to claim 9. Pet. 87 (citing Schofield Pet. Decl. ¶ 198).

We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 15 would have been obvious based on Brandt and Kiekhaefer.

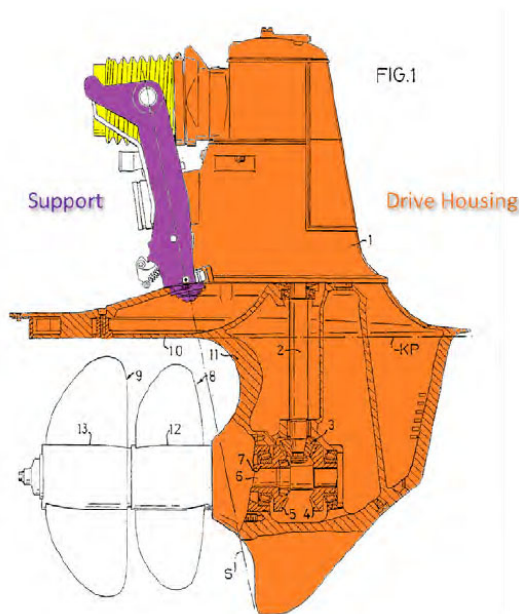
p. Dependent Claim 16

Claim 16 depends from claim 11 and adds “further comprising an engine housed within the hull of the boat, and a transmission input shaft extending through a transom of the boat into the gear case to provide a stem drive.” Ex. 1001, 7:7–10. For this claim, Petitioner highlights a passage in Brandt disclosing that its drive is an “inboard-outboard drive unit, **designed to be mounted on a boat transom and be connected to the output shaft of an engine.**” Pet. 87 (quoting, with emphasis added, Ex.1005, 2:60–63) (citing Schofield Pet. Decl. ¶ 199). Petitioner also notes a passage in the background of the ’692 patent discussing “stern drives.” Pet. 87–88 (discussing Ex. 1001, 1:19–21). Petitioner also provides the following additional modified version of Figure 1 of Brandt, which generally depicts the proposed modified device:

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Pet. 88. Prior to modification, Figure 1 of Brandt is a side view “in partial section of a double propeller drive unit.” Ex. 1005, 2:55–56. In the modified version, Petitioner has (1) generally reversed the direction of the structures below housing 1, (2) removed a small fin, (3) added a text box and purple highlighting for “Support,” (4) added a text box and orange highlighting for “Drive Housing,” and (5) added yellow highlighting to certain structure. Pet. 88.

According to Petitioner, this modified Figure 1 “discloses a protective boot (yellow) which [one of ordinary skill in the art] would have understood necessarily contains a transmission input shaft that would extend from a transom of the boat into the gearcase (i.e., a part of the orange drive housing shown below) to provide a stern drive.” *Id.* (citing Schofield Pet. Decl. ¶ 199). Petitioner adds that “[t]his is how practically all stern drive are configured and operate.” *Id.* (citing Schofield Pet. Decl. ¶ 199).

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We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Brandt as modified by Kiekhaefer, as proposed, satisfies the additional limitations of this claim. Patent Owner does not present arguments for this claim. Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 16 would have been obvious based on Brandt and Kiekhaefer.

q. Independent Claim 17

Petitioner contends that Brandt, modified based on Kiekhaefer, satisfies each of the limitations of claim 17. Pet. 46–53, 89–91. Petitioner identifies certain passages in the cited references and explains the significance of each passage with respect to the corresponding claim limitation. *Id.* Petitioner also articulates reasons to modify Brandt based on Kiekhaefer and argues that there would have been a reasonable expectation of success. Pet. 46–53. We address in turn below the subject matter of each limitation in claim 17, then Petitioner’s identified reasons to modify Brandt based on Kiekhaefer, and then objective evidence of nonobviousness.

(1) Elements 17[p] through 17[e]

For elements 17[p] through 17[e], Petitioner refers to the discussions for (1) element 1[p], (2) element 11[a], (3) elements 11[b] and 13[a], (4) element 11[c], (5) elements 11[d] and 1[e], and (6) elements 11[f] and 8[g], respectively. Pet. 89–91 (citing Schofield Pet. Decl. ¶¶ 200–207). Patent Owner does not present separate arguments for these elements. For the same reasons discussed above as to the parallel elements, we find, based on the complete record, that Petitioner has demonstrated by a preponderance of the

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evidence that the asserted prior art of Brandt and Kiekhäfer, as applied, satisfies each of elements 17[p] through 17[e].

*(2) The Modification of Brandt Based on
Kiekhäfer*

For claim 17, Petitioner relies on the same reasons to combine Brandt and Kiekhäfer, as well as the same reasonable expectation of success, as discussed above (*see* § II.E.2.a.7). *See* Pet. 46–53. Patent Owner does not provide arguments addressing the reasons to combine in the context of claim 17 for this asserted ground separate from those presented above as to claim 1. *See* § II.E.2.a.7. Accordingly, for the reasons above in the context of claim 1, we determine, in light of the complete record and in the context of claim 17 as to this asserted ground, that Petitioner has shown by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have had reason to combine Brandt and Kiekhäfer, as proposed, and would have had a reasonable expectation of success.

(3) Objective Indicia of Nonobviousness

The analysis of Patent Owner’s objective evidence of nonobviousness is the same for claim 17 in the context of this asserted ground as for claim 1. *See supra* § II.E.2.a.8.

(4) Conclusion

For the reasons discussed above (§ II.E.2.q.1–3), the evidence presented by Petitioner strongly indicates that claim 17 would have been obvious over the combination of Brandt and Kiekhäfer. For the same reasons discussed above (§ II.E.2.a.8), Patent Owner has not demonstrated a nexus; if we were to assume a nexus, Patent Owner’s objective evidence weighs somewhat in favor of nonobviousness. When considering all of the

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evidence of obviousness and nonobviousness together (*see In re Cyclobenzaprine*, 676 F.3d at 1079), we find Petitioner's strong evidence of obviousness outweighs Patent Owner's objective evidence of nonobviousness. Thus, we conclude Petitioner has demonstrated by a preponderance of the evidence that claim 17 would have been obvious over Brandt and Kiekhaefer.

r. Independent Claim 18

Petitioner contends that Brandt, modified based on Kiekhaefer, satisfies each of the limitations of claim 18. Pet. 46–53, 91–92. Petitioner identifies certain passages in the cited references and explains the significance of each passage with respect to the corresponding claim limitation. *Id.* Petitioner also articulates reasons to modify Brandt based on Kiekhaefer and argues that there would have been a reasonable expectation of success. Pet. 46–53. We address in turn below the subject matter of each limitation in claim 18, then Petitioner's identified reasons to modify Brandt based on Kiekhaefer, and then objective evidence of nonobviousness.

(1) Elements 18[p] through 18[e]

For elements 18[p] through 18[e], Petitioner refers to the discussions for (1) element 1[p], (2) element 8[a], (3) element 8[b], (4) element 8[c], (5) claim 10, and (6) element 8[g], respectively. Pet. 91–92 (citing Schofield Pet. Decl. ¶¶ 208–213). Patent Owner does not present separate arguments for these elements. For the same reasons discussed above as to the parallel elements, we find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the asserted prior art of Brandt and Kiekhaefer, as applied, satisfies each of elements 18[p] through 18[e].

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(2) The Modification of Brandt Based on Kiekhaefer

For claim 18, Petitioner relies on the same reasons to combine Brandt and Kiekhaefer, as well as the same reasonable expectation of success, as discussed above (*see* § II.E.2.a.7). *See* Pet. 46–53. Patent Owner does not provide arguments addressing the reasons to combine in the context of claim 18 for this asserted ground separate from those presented above as to claim 1. *See* § II.E.2.a.7. Accordingly, for the reasons above in the context of claim 1, we determine, in light of the complete record and in the context of claim 18 as to this asserted ground, that Petitioner has shown by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have had reason to combine Brandt and Kiekhaefer, as proposed, and would have had a reasonable expectation of success.

(3) Objective Indicia of Nonobviousness

The analysis of Patent Owner’s objective evidence of nonobviousness is the same for claim 18 in the context of this asserted ground as for claim 1. *See supra* § II.E.2.a.8.

(4) Conclusion

For the reasons discussed above (§ II.E.2.r.1–3), the evidence presented by Petitioner strongly indicates that claim 18 would have been obvious over the combination of Brandt and Kiekhaefer. For the same reasons discussed above (§ II.E.2.a.8), Patent Owner has not demonstrated a nexus; if we were to assume a nexus, Patent Owner’s objective evidence weighs somewhat in favor of nonobviousness. When considering all of the evidence of obviousness and nonobviousness together (*see In re Cyclobenzaprine*, 676 F.3d at 1079), we find Petitioner’s strong evidence of

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obviousness outweighs Patent Owner’s objective evidence of nonobviousness. Thus, we conclude Petitioner has demonstrated by a preponderance of the evidence that claim 18 would have been obvious over Brandt and Kiekhaefer.

F. Asserted Obviousness of Claims 4 and 7 Based on Brandt, Kiekhaefer, and Stechauner

Petitioner asserts that claims 4 and 7 of the ’692 patent are unpatentable under 35 U.S.C. § 103(a) based on Brandt, Kiekhaefer, and Stechauner. Pet. 3, 92–95. Patent Owner provides arguments addressing this asserted ground. PO Resp. 63–64.

Because the ground based on Brandt and Kiekhaefer is dispositive as to all the challenged claims, we need not reach the additional asserted ground. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (nonprecedential) (stating that the “Board need not address issues that are not necessary to the resolution of the proceeding,” such as “alternative arguments with respect to claims [the Board] found unpatentable on other grounds”); *SK Hynix Inc. v. Netlist, Inc.*, IPR2017-00692, Paper 25 at 40 (PTAB July 5, 2018) (determining all challenged claims to be unpatentable and not addressing additional grounds).

G. Contingent Motion to Amend

Under 35 U.S.C. § 316(d)(1) and 37 C.F.R. § 42.121(a), Patent Owner moves to substitute claims 1–18 with proposed claims 19–36 *only if* we reject Patent Owner’s proposed construction that claims 1–18 are limited to stern drives:

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If the Board declines to find that the drive of the challenged claims is limited to a stern drive, Patent Owner respectfully requests that the Board grant this Contingent Motion to Amend, and substitute the claims presented in Appendix A for the challenged claims. The Board should not consider this motion if it adopts Patent Owner's claim construction position that the drive of the challenged claims must be a stern drive.

MTA 2. Because we construe claims 1–18 as limited to stern drives (in line with Patent Owner's position (*see supra* § II.B.3), we dismiss the Contingent Motion to Amend.

III.CONCLUSION

Upon consideration of the briefing and the evidence of record, we determine that Petitioner (1) has *not* proven by a preponderance of the evidence that claims 1–3, 11–13, 15, 17, and 18 are anticipated by Kiekhaefer, (2) has *not* proven by a preponderance of the evidence that claims 4 and 7 would have been obvious based on Kiekhaefer and Stechauner, and (3) has proven by a preponderance of the evidence that claims 1–18 would have been obvious based on Brandt and Kiekhaefer.²¹ We need not reach the additional ground presented.

²¹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

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Because the contingent motion to amend was contingent on a claim construction issue resolved in favor of Patent Owner's position, we dismiss the Contingent Motion to Amend.

IV. ORDER

For the reasons above, it is:

ORDERED that Petitioner has proven by a preponderance of the evidence that claims 1–18 are unpatentable;

FURTHER ORDERED that Patent Owner's Contingent Motion to Amend is dismissed as to proposed substitute claims 19–36; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 318(b), upon expiration of the time for appeal of this decision, or the termination of any such appeal, a certificate shall issue canceling claims 1–18;

FURTHER ORDERED that the parties shall file, within 10 days of entry of this Decision, a joint motion to seal this Decision, and shall provide, along with the joint motion, an exhibit with a proposed redacted public version of this Decision; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–3, 11– 13, 15, 17, 18	102(a)	Kiekhaefer		1–3, 11–13, 15, 17, 18
4, 7	103	Kiekhaefer, Stechauner		4, 7
1–18	103	Brandt, Kiekhaefer	1–18	
4, 7	103	Brandt, Kiekhaefer, Stechauner ²²		
Overall Outcome			1–18	

Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	19–36
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	
Substitute Claims: Not Reached	19–36

²² As explained above, we do not reach this asserted ground because we have already found these claims unpatentable under Brandt and Kiekhaefer. See § II.F.

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US009630692B2

(12) **United States Patent**
Hasl et al.

(10) **Patent No.:** **US 9,630,692 B2**
(45) **Date of Patent:** **Apr. 25, 2017**

(54) **STEERABLE TRACTOR-TYPE DRIVE FOR BOATS**

(71) Applicant: **AB VOLVO PENTA**, Göteborg (SE)

(72) Inventors: **Emil Hasl**, Virginia Beach, VA (US);
William Gremminger, Virginia Beach, VA (US)

(73) Assignee: **AB VOLVO PENTA**, Gothenburg (SE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 82 days.

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Primary Examiner — Andrew Polay

(74) Attorney, Agent, or Firm — Martin Farrell; Michael Pruden

(21) Appl. No.: **14/501,270**

(22) Filed: **Sep. 30, 2014**

(65) **Prior Publication Data**

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(51) **Int. Cl.**
B63H 5/125 (2006.01)
B63H 5/10 (2006.01)
B63H 20/02 (2006.01)
B63H 20/16 (2006.01)

(52) **U.S. Cl.**
CPC **B63H 5/125** (2013.01); **B63H 5/10** (2013.01); **B63H 20/16** (2013.01); **B63H 2020/025** (2013.01)

(58) **Field of Classification Search**
CPC B63H 20/16; B63H 20/18; B63H 20/22; B63H 20/12; B63H 2020/006; B63H 20/00
USPC 440/51
See application file for complete search history.

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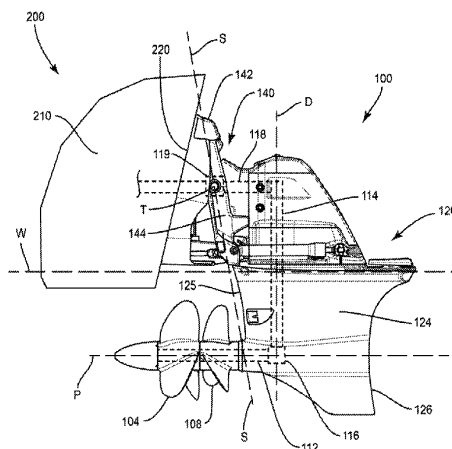
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(57) **ABSTRACT**

A tractor-type stern drive for a boat includes a drive housing pivotally attached to the stern of the boat about a steering axis. At least one pulling-type propeller is rotatably mounted to a forward end of the gear casing. The at least one propeller is powered by a vertical drive shaft perpendicular to the propeller shaft axis. The steering axis is offset forward of the drive shaft to help minimize steering torque about the steering axis.

18 Claims, 4 Drawing Sheets

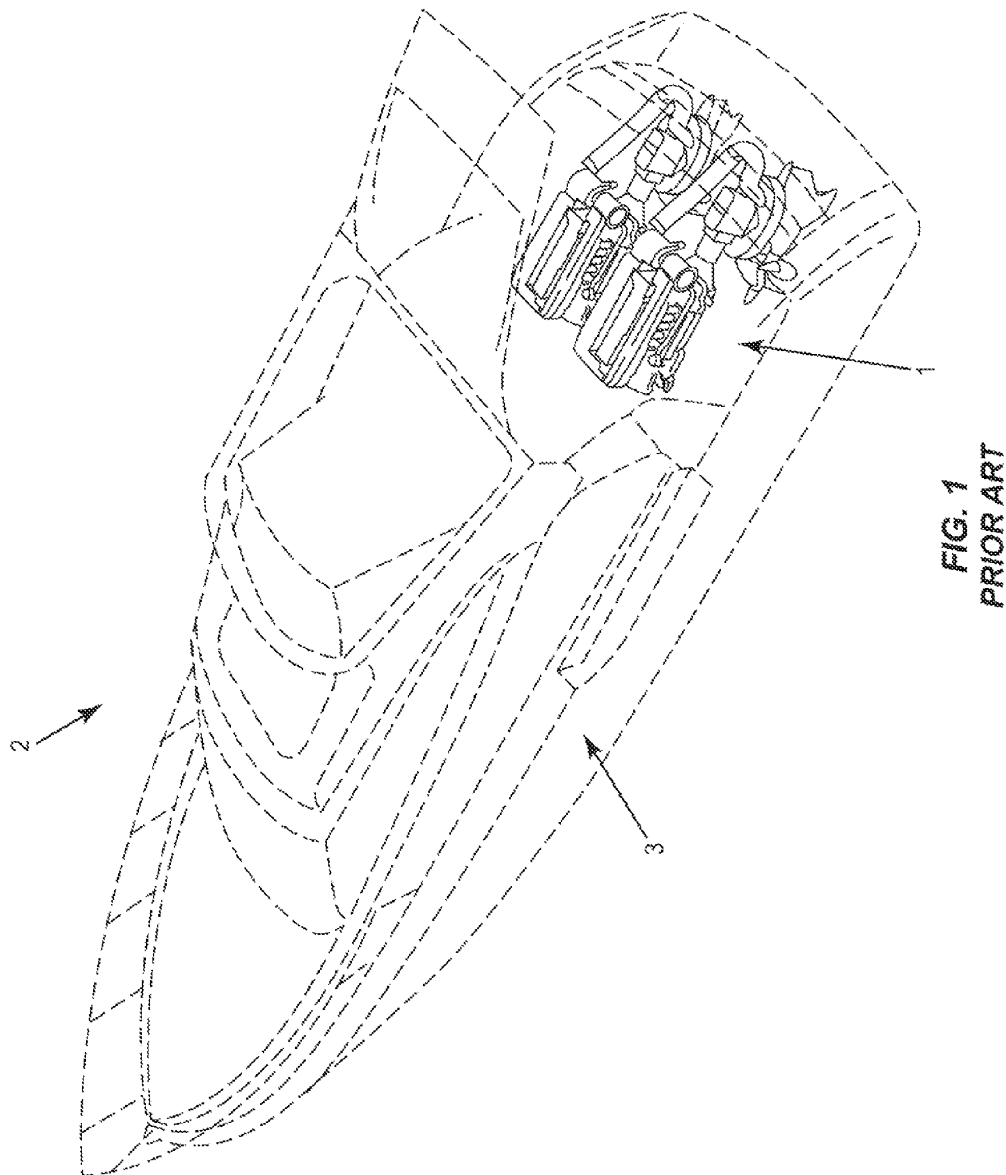


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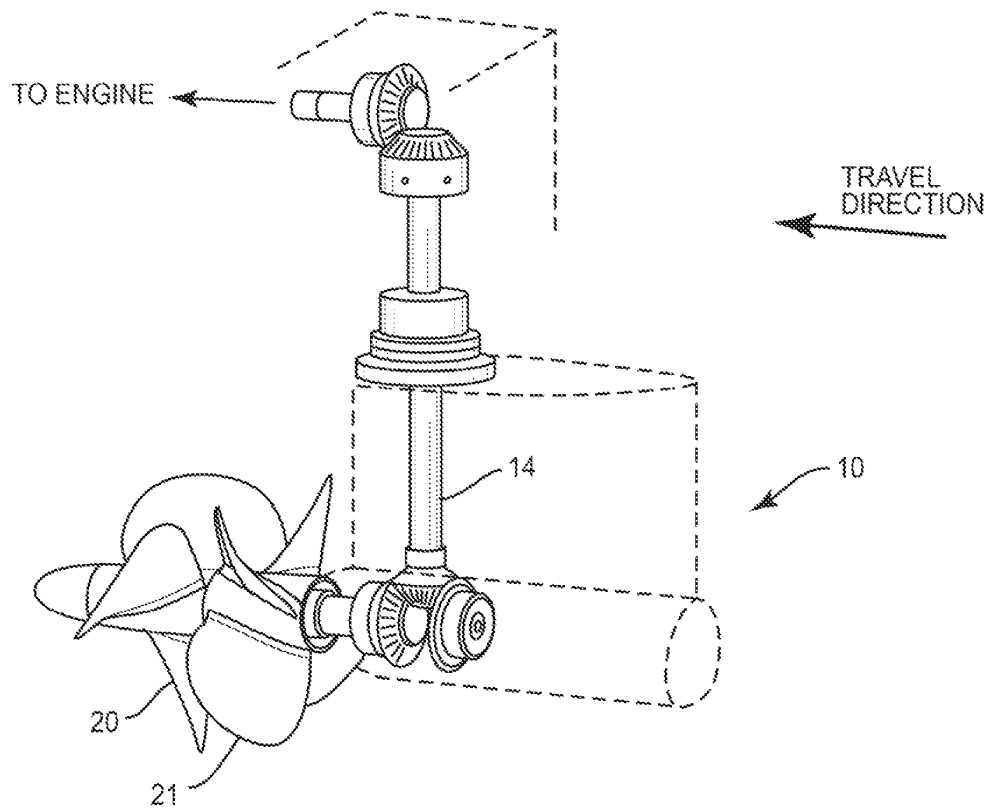


FIG. 2
PRIOR ART

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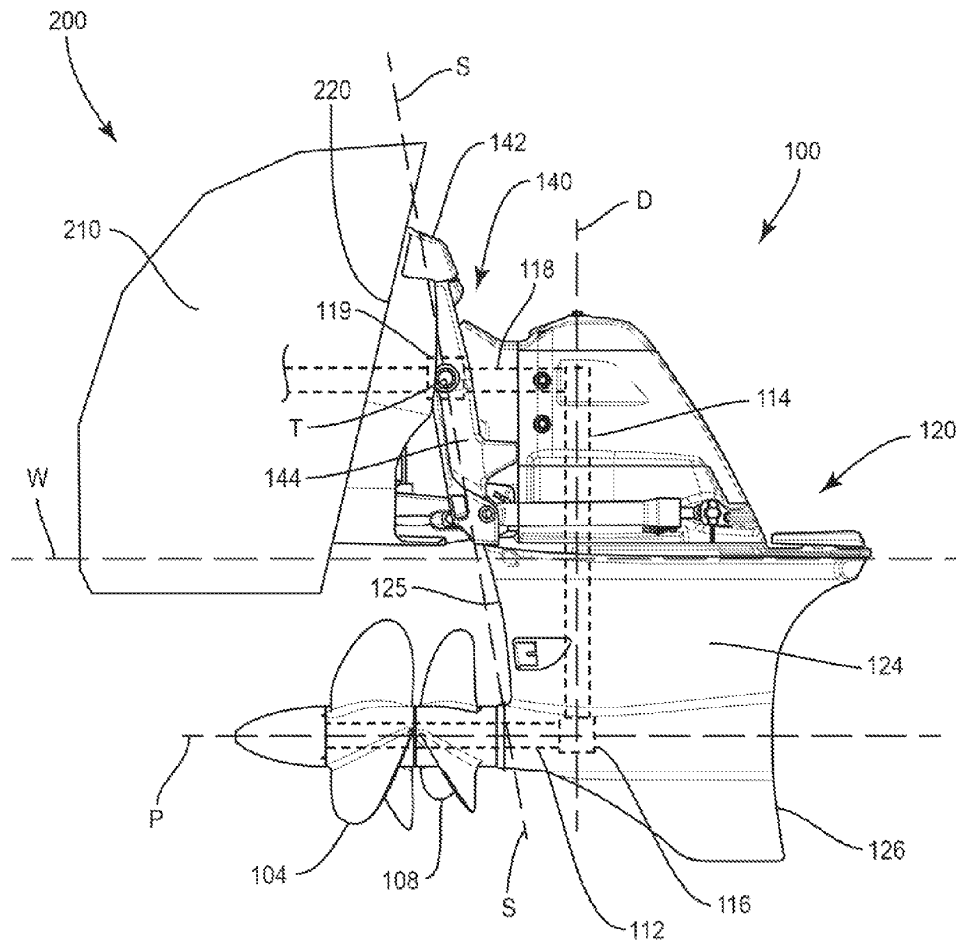


FIG. 3

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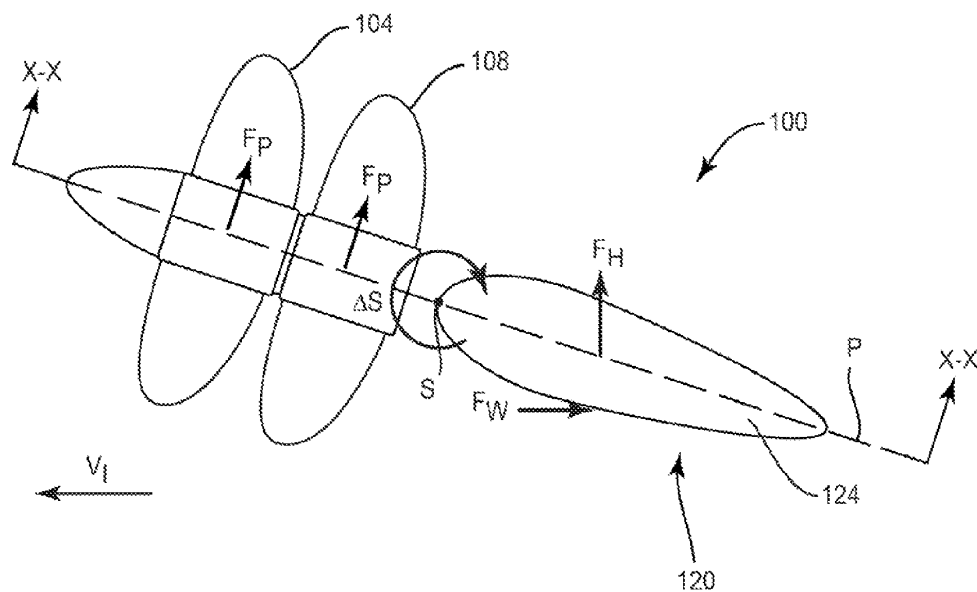


FIG. 4

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**STEERABLE TRACTOR-TYPE DRIVE FOR
BOATS****TECHNICAL FIELD**

This disclosure relates to marine drives. Particularly, this disclosure relates to tractor-type drives, those having forward facing propellers configured to pull a boat through the water.

BACKGROUND

Marine drives may be generally classified as inboard, outboard, or inboard/outboard. In an inboard drive, the engine and transmission (or drive) are mounted in the hull and a propeller shaft extends through the bottom of the hull. In an outboard drive, the propeller drive and engine are generally configured as a unit attached to and located outside the hull. Inboard/outboard drives, also referred to as stern drives, have an engine mounted in the hull connected to a drive unit mounted outside of the hull, typically on the stern.

Marine drive units can be further classified as pushing-type and tractor-type. Pushing-type drives generally rely upon propellers facing rearward relative to the boat and generating propulsive force that pushes the boat through the water. Tractor-type drives generally rely upon one or more forward, bow-facing propellers that produce propulsive force to pull the boat through the water. Tractor-type drives may also be referred to as pulling-type drives.

FIG. 1 shows a prior art tractor-type drive arrangement 1 on a boat 2. This arrangement known commercially as the Volvo Penta IPS system, includes an engine with a two-part drive (two engines and drives are shown in the figure). The engine and an upper drive module are mounted in the hull and a steerable lower drive module, or pod, with tractor propellers, is mounted below the hull. The Volvo Penta IPS is considered an inboard drive.

A similar tractor-type drive is described in U.S. Pat. No. 7,226,327, assigned to AB Volvo Penta. FIG. 2 is reproduced from the '327 patent and shows a schematic illustration functionally equivalent to the tractor-type drive 1 from FIG. 1. A pair of forward facing propellers 20, 21 rotate in opposite directions to pull a boat through the water. The propellers 20, 21 are carried on concentric shafts rotatably mounted to an underwater housing 10. The underwater housing 10 is steerable about a substantially vertical pivot axis that coincides with a vertical drive shaft 14, which transmits power from an engine output shaft 16 to the propellers 20, 21. Rotating the underwater housing 10 about the steering axis through the vertical drive shaft 14 directs the propeller force to steer the boat and allows the underwater housing 10 to act as a rudder.

SUMMARY

An embodiment of this disclosure includes a steerable tractor-type drive for a boat. The drive includes a drive support mountable to a stern of the boat and a gear case (or drive housing) pivotally attached to the drive support about a steering axis. At least one pulling-type propeller is mounted on a propeller shaft extending from a front end of the gear case, the propeller shaft to be rotated by a vertical drive shaft perpendicular to a propeller shaft axis. The steering axis is offset forward of the vertical drive shaft.

Another embodiment of this disclosure includes a drive for a boat. The drive has a gear case with at least one front-facing propeller for pulling the boat through the water.

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The drive also has a drive support for mounting the gear case to the boat. The gear case pivots relative to drive support about a steering axis to steer the boat. The gear case and the drive support are configured such that the at least one propeller is located forward of the steering axis and a center of pressure generated by water rushing past the gear case during a turn is located rearward of the steering axis.

Another embodiment of this disclosure includes a boat. The boat has a hull, thereby having a bow and a stern. The boat includes at least one pulling-type propeller forwardly mounted to a gear case. A drive support steerably mounts the gear case to the stern of the boat. The gear case rotates about a steering axis positioned such that a center of pressure generated by water rushing past the gear case during a turn is located rearward of the steering axis.

These and other aspects of the present invention will become apparent to those skilled in the art after a reading of the following description of the preferred embodiments, when considered in conjunction with the drawings. It should be understood that both the foregoing general description and the following detailed description are explanatory only and are not restrictive of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the present invention are well understood by reading the following detailed description in conjunction with the drawings in which like numerals indicated similar elements and in which:

FIG. 1 shows a boat including a prior art tractor-type drive;

FIG. 2 shows a schematic view of a prior art tractor-type drive;

FIG. 3 shows a tractor-type drive according to embodiments of the present disclosure;

FIG. 4 shows a schematic force diagram according to embodiments of the present disclosure.

DETAILED DESCRIPTION

Exemplary embodiments of this disclosure are described below and illustrated in the accompanying figures, in which like numerals refer to like parts throughout the several views. The embodiments described provide examples and should not be interpreted as limiting the scope of the invention. Other embodiments, and modifications and improvements of the described embodiments, will occur to those skilled in the art and all such other embodiments, modifications and improvements are within the scope of the present invention. Features from one embodiment or aspect may be combined with features from any other embodiment or aspect in any appropriate combination. For example, any individual or collective features of method aspects or embodiments may be applied to apparatus, product or component aspects or embodiments and vice versa.

As used herein, the terms "front" and "forward" are defined based on the drives as mounted to the boat with respect to a bow to stern direction of the boat. Likewise, the terms "back", "rear", "rearward", and "aft" are also defined based on the drive as mounted to the boat with respect to a bow-to-stern direction of the boat.

Applicants have determined that in some situations, significant steering loads can be caused by the high transverse loading from forward facing propellers. These steering loads can be felt by the operator through the steering wheel and may present a challenge to some operators. Such steering loads may be more pronounced during steering maneuvers,

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particularly at high speeds. The propeller forces from forward facing propellers cause a torque about the steering axis during steering. The steering forces may be caused by the increased lift of the propeller blades that rotate into the water flow, combined with the decreased lift of the propeller blades that move with the water flow. These steering forces can occur in either direction as the gear case is pivoted. The resulting torque biases the propellers and the gear case to attempt to continue to rotate in the direction of steering.

FIG. 3 shows a drive **100** that is a tractor-type propulsion system for a boat **200**. A tractor-type system has been shown to have several benefits over the more common push-type systems that lead to improved range, higher speeds, reduced fuel consumption and lower emissions. Particularly, the tractor-type drives place the forward facing propellers in less disturbed water, which increases the ability of the propellers to convey energy to the water and propel the boat. Placing the propellers further under the boat allows them to be more likely to remain submerged under the water when the drive unit is trimmed, allowing for higher trim angles at slow speeds. Positioning the propellers forward of the drive housing reduces exposure of swimmers at the rear of the boat. Use of the tractor-type drives also allows the exhaust to be directed into the propeller wash, flushing the exhaust further rearward of the boat.

The drive **100** is configured to have improved steering by reducing the net torque around its steering axis. The drive **100** is configured to be mounted to the stern **210** of the boat **200**, and to pull the boat **200** through the water. In order to pull the boat **200** through the water, the drive **100** can include a dual propeller arrangement, including a forward propeller **104** and a rearward propeller **108**, each of which is considered front-facing, i.e. mounting to a front end of a drive housing **120**. The forward and rearward propellers **104**, **108** can be driven by a pair of propeller shafts **112** that are coaxial and counter-rotating. The propeller shafts **112** are housed within and extend from the front end of the gear case **120**. The propeller shafts **112** coincide with a propeller shaft axis **P** shown in FIG. 3.

Similar to the prior art shown in FIG. 2, the propeller shafts **112** are driven by a vertical drive shaft **114** positioned substantially perpendicular to the propeller shafts **112**, and along drive shaft axis **D**. A gear arrangement **116** may operatively connect the propeller shafts **112** with the drive shaft **114**. Drive shaft axis **D** is substantially vertical with respect to the waterline when the boat **200** is still. The drive shaft **114** may be rotated by an input shaft **118** which is coupled to receive drive torque from an engine (not illustrated) housed within the boat **200**. The input shaft **118** includes a universal joint **119** to accommodate steering and tilting movements of the drive housing.

The drive **100** further includes a drive support **140** for mounting the drive housing **120** to the stern **210** of the boat **200**, particularly the boat's transom **220**. The drive support **140** allows the drive housing **120** to pivot relative to the boat **200** about a substantially vertical steering axis **S** and about a substantially horizontal tilt/trim axis **T**. The drive support **140** may include a transom shield **142** fixed to the transom **220** and a gimbal ring **144** pivotally mounted to the transom shield. In the embodiment shown, the gimbal ring **144** pivots relative to the transom shield on the steering axis **S** and the drive housing **120** pivots relative to the gimbal ring on the tilt/trim axis **T**, although other arrangements are possible. The universal joint **119** is positioned at the intersection of the steering axis **S** and the tilt/trim axis **T**. By pivoting the drive housing **120** on the steering axis **S**, the drive **100** is able to direct the propulsive force of the propellers to steer the boat

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200. An underwater portion **124** of the gear case **120** acts as a rudder to deflect water flowing past the underwater portion **124**.

The connection between the drive support **140** and the drive housing **120** defines a steering axis **S** about which the drive housing **120** pivots. The drive housing **120** may be selectively pivoted about the steering axis **S** in response to operator input by mechanical, hydraulic, pneumatic or other actuation means known in the art. Unlike prior steerable tractor-type drives, the drive **100** of this disclosure has its steering axis **S** offset from the vertical drive shaft axis **D**. Therefore, the steering axis **S** and the drive shaft axis **D** are not coaxial. In the illustrated embodiment, the steering axis **S** is moved forward, or ahead of the drive shaft axis **D**. Both the steering axis **S** and the drive shaft axis **D** may be generally considered as lying in a plane (see X-X in FIG. 4) normal to the surface of the water **W** and containing the propeller axis **P**. In the embodiment of FIG. 3, the steering axis **S** is not parallel to the drive shaft axis **D**. Therefore the steering axis **S** and the drive shaft axis **D** will intersect at some point. However, the steering axis **S** should be considered offset forward of the drive shaft axis **D** if the steering axis **S** intersects the propeller axis **P** at a location ahead of where the drive shaft axis **D** intersects the propeller axis **P**. In some embodiments, the steering axis **S** is angled with respect to the drive shaft axis **D** so that they intersect at a location below the surface of the water **W**. In some other embodiments, the steering axis **S** is angled with respect to the drive shaft axis **D** to intersect at a location below the drive housing **120**. Among other advantages discussed below, removing the steering function from along the drive shaft axis **D** allows for a smaller packaging size of the drive housing **120**, particularly the underwater portion **124**.

More specifically, displacing the steering axis **S** in a forward direction relative to the drive shaft axis **D** provides a dual set of advantages resulting in steering force reduction. First, moving the steering axis **S** forward, closer to the planes of rotation of the forward and rearward propellers **104**, **108** reduces the steering torque about the steering axis **S** by decreasing the moment arm of each propeller force **FP** (see FIG. 4). Second, shifting the steering axis **S** alters the relative position of the center of pressure applied to the underwater portion **124** of the drive housing **120** by water flowing on the drive housing **120** during a steering maneuver. The center of pressure is the point where the total sum of a pressure field may be considered to act on a body, in this case, the point where the net force of the water flow acts on the underwater portion **124**. As seen in FIG. 4, the drive housing **120**, particularly the underwater portion **124**, is mostly rearward of the steering axis **S**, and is preferably almost entirely rearward of the steering axis **S**. Thus, the center of pressure of the water flow upon the drive housing **120** will necessarily be rearward of the steering axis **S** and opposite from the propeller force **FP** relative to the steering axis **S**.

The underwater portion **124** has a leading edge **125** and a trailing edge **126**, as seen in the side view of FIG. 3. At least a portion of the leading edge **125** is both forward of the drive shaft axis **D** and rearward of the steering axis **S**. Preferably, a majority of the leading edge **125** is rearward of the steering axis **S**. In some embodiments, the trailing edge **126** is entirely rearward of the steering axis **S**.

Mitigation of net steering torque can be better understood, with reference to the force diagram of FIG. 4, particularly with respect to the center of pressure caused by the water. FIG. 4 represents a drive **100**, according to embodiments of this disclosure, during a turn. The boat is initially traveling

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along the direction V_f . To perform a left turn, the drive **100** is rotated about steering axis S in the direction shown by the arrow ΔS . The rotation about steering axis S rotates the forward and rearward propellers **104**, **108** to a position initially oblique to the oncoming water. When the propeller axis P is oblique to the oncoming water, the lift experienced by the propellers' blades is inconsistent as each blade rotates around the propeller axis P. During a portion of a revolution, a blade is turning relatively against the oncoming water and during a portion of the revolution the blade is turning relatively with the oncoming water. The inconsistency leads to an imbalance that can cause relatively large net propeller steering forces F_p to be generated for each of the forward and rearward propellers **104**, **108** acting in a direction to continue the rotation ΔS about steering axis S.

On the other hand, the underwater portion **124** of the drive housing **120** is rotated into the flow of water rushing past the drive **100** during the turn. The water provides a force F_w upon the underwater portion **124** acting at a pressure center located behind the steering axis S and in a direction substantially opposite to the initial direction V_f . The water force F_w results in a housing force F_H located rearward of the steering axis S that provides a torque that opposes the torque of propeller forces F_p around steering axis S. Therefore, the net steering forces on the drive **100** as felt by the operator are reduced as compared to other drives of the steerable tractor-type.

The housing force F_H can be optimized by adjusting the projected surface area of the side profile of the underwater portion **124** of the gear case **120**, thereby adjusting the surface area rearward of the steering axis S upon which oncoming water impinges to increase or decrease the magnitude of F_H .

Although the above disclosure has been presented in the context of exemplary embodiments, it is to be understood that modifications and variations may be utilized without departing from the spirit and scope of the invention, as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the appended claims and their equivalents. Features from one embodiment or aspect may be combined with features from any other embodiment or aspect in any appropriate combination. For example, any individual or collective features of method aspects or embodiments may be applied to apparatus, product or component aspects or embodiments and vice versa.

We claim:

1. A steerable tractor-type drive for a boat, comprising:
 - a drive support mountable to a stern of the boat;
 - a drive housing pivotally attached to the support about a steering axis, the drive housing having a vertical drive shaft connected to drive a propeller shaft, the propeller shaft extending from a forward end of the drive housing;
 - at least one pulling propeller mounted to the propeller shaft,
 - wherein the steering axis is offset forward of the vertical drive shaft.
2. The drive of claim 1, wherein the drive housing includes an underwater portion configured to be below the waterline of the boat, wherein the underwater portion is almost entirely rearward of the steering axis.
3. The drive of claim 1, wherein the drive housing includes an underwater portion configured to be below the waterline of the boat, wherein the underwater portion has a leading edge, wherein a majority of the leading edge is rearward of the steering axis.

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4. The drive of claim 1, wherein two counter-rotating propellers are mounted on the propeller shaft and wherein the steering axis is rearward of at least a forward propeller at a location where the steering axis intersects a propeller axis.

5. The drive of claim 1, wherein the steering axis is angled with respect to the drive shaft so that the steering axis intersects with a vertical drive shaft axis at a location below the waterline of the boat.

6. The drive of claim 5, wherein the steering axis intersects the vertical drive shaft axis at a location below the drive housing.

7. The drive of claim 1, comprising a pair of coaxial, counter-rotating pulling propellers.

8. A drive for a boat, comprising:

a drive housing with at least one front-facing propeller for pulling the boat through the water; and

a drive housing support for mounting the drive housing to the boat, the drive housing including an underwater portion configured to be below the waterline of the boat,

wherein the drive housing pivots relative to the drive housing support about a steering axis to steer the boat, wherein the underwater portion is almost entirely rearward of the steering axis, wherein the at least one front-facing propeller is carried by a propeller shaft rotated by a vertical drive shaft substantially perpendicular to a propeller shaft axis, wherein the steering axis intersects a drive shaft axis at a location below the drive housing, and wherein the drive housing and the drive housing support are configured such that a center of pressure applied by water moving past the drive housing during a turn is located rearward of the steering axis.

9. The drive of claim 8, wherein the entire drive housing pivots about the steering axis relative to the drive housing support to steer the boat.

10. The drive of claim 8, wherein the steering axis is at least partially rearward of the at least one front-facing propeller at a location where the steering axis intersects a propeller axis.

11. A boat, comprising:

a hull having a stern;

a drive housing having at least one pulling-type propeller forwardly mounted thereon; and

a drive housing support steerably mounting the drive housing to the stern of the boat,

wherein, the drive housing rotates relative to the drive housing support about a steering axis, wherein the steering axis is at least partially rearward of the at least one pulling-type propeller at a location where the steering axis intersects a propeller shaft axis, and wherein the steering axis is positioned such that the propeller is located forward of the steering axis and a center of pressure applied by water moving past the drive housing during a turn is located rearward of the steering axis.

12. The boat of claim 11, wherein the drive housing includes an underwater portion configured to be below the waterline of the boat, wherein the underwater portion is almost entirely rearward of the steering axis.

13. The boat of claim 11, wherein the at least one pulling-type propeller is carried on a propeller shaft rotated by a drive shaft perpendicular to the propeller shaft axis, and wherein the steering axis is offset forward of the drive shaft.

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14. The boat of claim 11, wherein the steering axis intersects a drive shaft axis at a location below the drive housing.

15. The boat of claim 11, wherein the entire drive housing pivots about the steering axis relative to the drive housing support to steer the boat. 5

16. The boat of claim 11, further comprising an engine housed within the hull of the boat, and a transmission input shaft extending through a transom of the boat into the gear case to provide a stern drive.

17. A boat, comprising: 10

a hull having a stern;

a drive housing having at least one pulling-type propeller forwardly mounted thereon, the at least one pulling-type propeller being carried on a propeller shaft rotated by a drive shaft perpendicular to the propeller shaft axis, 15

a drive housing support steerably mounting the drive housing to the stern of the boat,

wherein, the drive housing rotates relative to the drive housing support about a steering axis, the steering axis offset forward of the drive shaft, and 20

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wherein, the steering axis is positioned such that the propeller is located forward of the steering axis and a center of pressure applied by water moving past the drive housing during a turn is located rearward of the steering axis.

18. A drive for a boat, comprising:

a drive housing with at least one front-facing propeller for pulling the boat through the water; and

a drive housing support for mounting the drive housing to the boat, wherein the drive housing pivots relative to the drive housing support about a steering axis to steer the boat, wherein the steering axis is at least partially rearward of the at least one front-facing propeller at a location where the steering axis intersects a propeller axis, and wherein the drive housing and the drive housing support are configured such that a center of pressure applied by water moving past the drive housing during a turn is located rearward of the steering axis.

* * * * *

FORM 30. Certificate of Service

Form 30
July 2020

**UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

CERTIFICATE OF SERVICE

Case Number 22-1765

Short Case Caption Volvo Penta of the Americas, LLC v. Brunswick Corporation

NOTE: Proof of service is only required when the rules specify that service must be accomplished outside the court's electronic filing system. See Fed. R. App. P. 25(d); Fed. Cir. R. 25(e). Attach additional pages as needed.

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on the below individuals at the following locations.

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☐ Additional pages attached.

Date: 09/21/2022

Signature: /s/ John C. Alemanni

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FORM 19. Certificate of Compliance with Type-Volume Limitations

Form 19
July 2020

**UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATIONS

Case Number: 22-1765

Short Case Caption: Volvo Penta of the Americas, LLC v. Brunswick Corporation

Instructions: When computing a word, line, or page count, you may exclude any items listed as exempted under Fed. R. App. P. 5(c), Fed. R. App. P. 21(d), Fed. R. App. P. 27(d)(2), Fed. R. App. P. 32(f), or Fed. Cir. R. 32(b)(2).

The foregoing filing complies with the relevant type-volume limitation of the Federal Rules of Appellate Procedure and Federal Circuit Rules because it meets one of the following:

- ☒ the filing has been prepared using a proportionally-spaced typeface and includes 12,977 words.
- ☐ the filing has been prepared using a monospaced typeface and includes _____ lines of text.
- ☐ the filing contains _____ pages / _____ words / _____ lines of text, which does not exceed the maximum authorized by this court's order (ECF No. _____).

Date: 09/21/2022

Signature: /s/ John C. Alemanni

Name: John C. Alemanni

FORM 31. Certificate of Confidential Material

Form 31
July 2020

**UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

CERTIFICATE OF CONFIDENTIAL MATERIAL

Case Number: 22-1765

Short Case Caption: Volvo Penta of the Americas, LLC v Brunswick Corporation

Instructions: When computing a confidential word count, Fed. Cir. R. 25.1(d)(1)(C) applies the following exclusions:

- Only count each unique word or number once (repeated uses of the same word do not count more than once).
- For a responsive filing, do not count words marked confidential for the first time in the preceding filing.

The limitations of Fed. Cir. R. 25.1(d)(1) do not apply to appendices; attachments; exhibits; and addenda. *See* Fed. Cir. R. 25.1(d)(1)(D).

The foregoing document contains 10 number of unique words (including numbers) marked confidential.

- ☒ This number does not exceed the maximum of 15 words permitted by Fed. Cir. R. 25.1(d)(1)(A).
- ☐ This number does not exceed the maximum of 50 words permitted by Fed. Cir. R. 25.1(d)(1)(B) for cases under 19 U.S.C. § 1516a or 28 U.S.C. § 1491(b).
- ☐ This number exceeds the maximum permitted by Federal Circuit Rule 25.1(d)(1), and the filing is accompanied by a motion to waive the confidentiality requirements.

Date: 09/21/2022

Signature: /s/ John C. Alemanni

Name: John C. Alemanni